Installation and service instructions

for contractors

Vitocal 300-G
Type BW/BWS, WW/WWS, 21 to 45 kW
Compact heat pump with electric drive
Single and two-stage

For applicability, see the last page

VITOCAL 300-G

5442 829 GB 11/2009

Please keep safe.

Safety instructions

Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

Danger
This symbol warns against the risk of injury.

Please note
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively designed for qualified personnel.
- Work on electrical equipment must only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations

Observe the following when working on this system
- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- the Code of Practice of relevant trade associations.
- all current safety regulations as defined by DIN, EN, DVGW, VDE and all locally applicable standards

Working on the system

- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing a separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.

Please note
Electronic modules can be damaged by electrostatic discharges.
Touch earthed objects, such as heating or water pipes, to discharge static loads.

Repair work

Please note
Repairing components that fulfil a safety function can compromise the safe operation of your heating system.
Replace faulty components only with original Viessmann spare parts.

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Safety instructions (cont.)

Ancillary components, spare and wearing parts

Please note
Spare and wearing parts that have not been tested together with the heating system can compromise its function. Installing non-authorised components and non-approved modifications or conversions can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts supplied or approved by Viessmann.

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Index (cont.)

Product information

Vitocal 300-G, Type BW and WW

Brine/water or water/water heat pump with electronic heat pump control unit Vitotronic 200, type WO1A
The refrigerant circuit has an electronic expansion valve (EEV) with an independent control circuit.
For type WW, a separate well circuit provides the primary circuit with heating energy via a separating heat exchanger (accessory). The well circuit is also controlled by heat pump control unit Vitotronic 200, type WO1A.
All sensors are fitted inside sensor wells.
The heat pump control unit can activate and control a heating circuit provided on site for cooling or a separate cooling circuit.
For central and DHW heating, an instantaneous heating water heater (on site) can also be controlled.
The output can be extended in conjunction with heat pump stage 2 (Vitocal 300-G, type BWS).

Vitocal 300-G, type BWS and WWS

The Vitocal 300-G, type BWS and WWS, are used to extend the output (stage 2) of heat pumps type BW and WW.
Heat pump stage 2 (type BWS/WWS) can be used both for heating operation and DHW heating. Accordingly, a second secondary pump or circulation pump for cylinder heating (on the heating water side) is required.
Heat pump stage 2 (type BWS/WWS) does not have its own heat pump control unit and is controlled by the heat pump control unit Vitotronic 200, type WO1A of the heat pump (type BW/WW).
Heat pump stage 2 (type BWS/WWS) has its own refrigerant circuit. This means a separate power supply is required for every compressor.
With the two-stage version, either a primary pump can be used for every heat pump, or a common external primary pump can be used. Independently, a collective flow and return temperature sensor is used on the primary side at the common flow and return.
Heat pump stage 2 (type BWS/WWS) must be installed to the left of the heat pump (type BW/WW).
The hydraulic connection between two heat pumps is carried out on site.
An instantaneous heating water heater (on site) can only be controlled by heat pump stage 1 (type BW/WW) (for heat pump cascades only by the lead appliance).

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General information - electrical connection

- The total output of all components connected directly to the heat pump control unit (e.g. pumps, valves, message facilities, contactors) must not exceed 1000 W.
  If the total load ≤ 1000 W, the individual rating of a component (e.g. pump, valve, message facility, contactor) can be greater than specified (observe max. contact load; see also page 241).
- If the compressor and/or instantaneous heating water heater (on site) are operated at a lower tariff (power-OFF), provide an additional cable for the power-OFF signal (e.g. NYM 3 x 1.5 mm^2) from the distribution board (meter box) to the heat pump control unit (see page 104).
- The number of power cables from the distribution board (meter box) to the heat pump control unit depends on the system version and tariffs used (see from page 103).
- The cores of the KM BUS cable are interchangeable.

For further information, see heat pump control unit and power supply (page 103).

Installation

For handling purposes, the heat pump module can be removed (see page 168).

Please note
Avoid damaging the appliance during handling.
Never put weight on top of the appliance.

Please note
If the compressor is at a steep angle in the heat pump, lubricant will enter the refrigerant circuit and damage the appliance.
Max. tilting angle 45°.

Installation room requirements

Please note
The installation room must be dry and free from the risk of frost.
Ensure ambient temperatures of 0 to 35 ºC.

Please note
Avoid risk of explosion due to dust, gases and vapours in the installation room.

Installation (cont.)

! **Please note**
Observe the permissible floor load.

■ **Total weight**

BW 121	282 kg
BWS 121	277 kg
BW 129	305 kg
BWS 129	300 kg
BW 145	345 kg
BWS 145	340 kg

■ To prevent structure-borne noise, never set up the appliance on ceilings with wooden joists (e.g. in the attic).

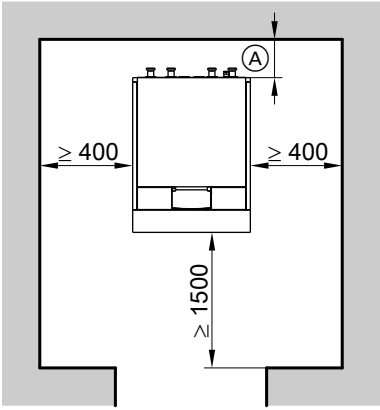
■ Level the appliance.
If the adjustable feet are used to compensate for an uneven floor (max. 10 mm), the pressure load on the feet must be distributed evenly.

■ Observe the required floor area and minimum room volume (as per DIN EN 378):

Type	Floor area	Min. space requirement
BW/BWS 121	5 m^2	14 m^3
BW/BWS 129	7 m^2	17 m^3
BW/BWS 145	9 m^2	123 m^3

■ Observe required minimum clearances:

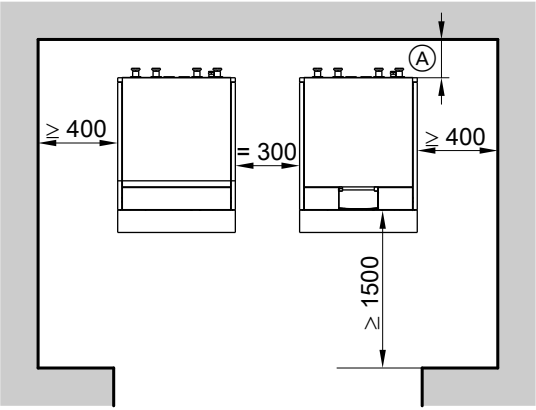
Single stage (type BW)



Ⓐ Clearance depends on on-site installation and location

Installation (cont.)

Two stage (type BW/BWS)

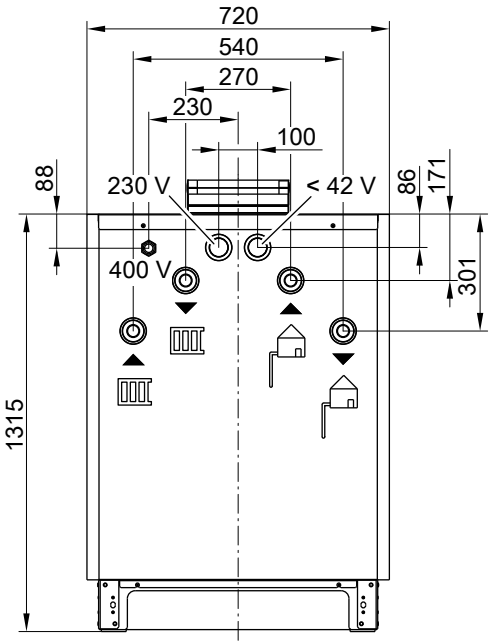


Ⓐ Clearance depends on on-site installation and location

Installation (cont.)

Requirements - on-site connections

Single stage (type BW)



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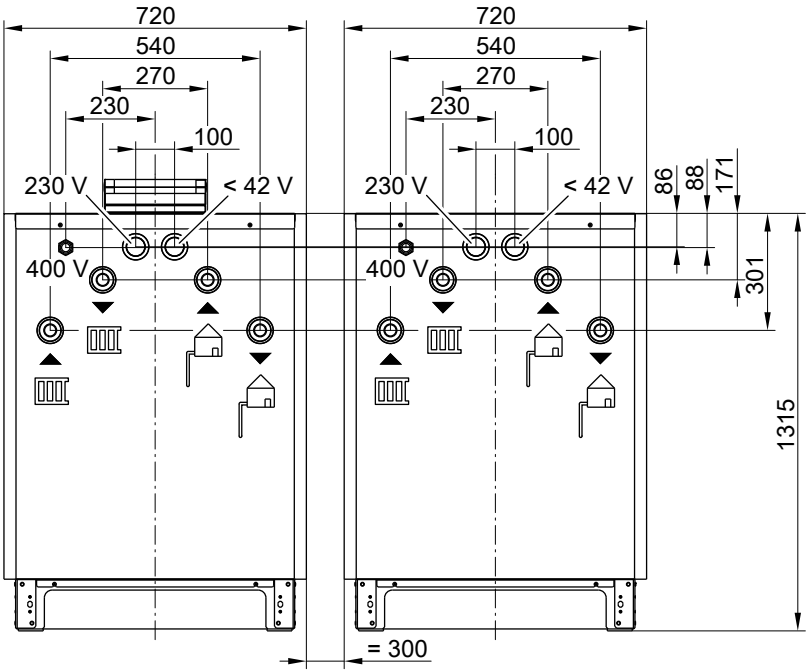
Installation (cont.)

Two stage (type BW/BWS)



- Install hydraulic connections on site stress-free.
- Establish hydraulic connections between the two heat pumps (type BW/BWS) on site.
- All required components (with a suitably designed plate heat exchanger) for the cooling circuit must be provided on site.

Installation (cont.)

Line lengths in the heat pump plus wall clearance:

Type	BW	BWS
Heat pump control unit power supply (230 V~)	1.0 m	A connecting cable is used for the power supply
Compressor power supply (400 V~)	1.0 m	1.0 m
Additional power cables	1.5 m	Connecting cable

Recommended power cables:

Type	Heat pump control unit (230 V~)	Compressor (400 V~)	
			Max. cable length
BW 121	3 x 1.5 mm^2	4 x 2.5 mm^2	50 m
BWS 121	—	4 x 2.5 mm^2	50 m
BW 129	3 x 1.5 mm^2	4 x 4.0 mm^2	50 m
BWS 129	—	4 x 4.0 mm^2	50 m
BW 145	3 x 1.5 mm^2	4 x 6.0 mm^2	40 m
BWS 145	—	4 x 6.0 mm^2	40 m

Note
*An instantaneous heating water heater (on site) can **only** be installed outside the heat pump (on site). The flow temperature sensor system must be installed in the direction of flow downstream of the instantaneous heating water heater.*

Overview of possible system schemes

The following table provides an overview of **all** possible system schemes.

Overview of possible system schemes (cont.)

	System diagram (ID 7000)											
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Heating circuit												
A1	–	X	X	–	–	X	X	–	–	X	X	–
M2	–	–	–	X	X	X	X	X	X	X	X	–
M3	–	–	–	–	–	–	–	X	X	X	X	–
DHW cylinder	X	–	X	–	X	–	X	–	X	—	X	–
Heating water buffer cylinder	–	○	○	X	X	X	X	X	X	X	X	–
External heat source	–	○*1	○*1	○	○	○	○	○	○	○	○	–
Cooling mode (only one "cooling circuit" possible)												
Heating circuit												
A1	–	○	○	–	–	○	○	–	–	○	○	–
M2	–	–	–	○	○	○	○	○	○	○	○	–
M3	–	–	–	–	–	–	–	○	○	○	○	–
Separate cooling circuit	○	○	○	○	○	○	○	○	○	○	○	–
Swimming pool	○	○	○	○	○	○	○	○	○	○	○	–
Solar thermal system (only with Vitosolic 100/200)	○	–	○	–	○	–	○	–	○	–	○	–

X Requirement
○ Option

*1 *Only in conjunction with a heating water buffer cylinder.*

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Function description for the system examples

Note
*The system examples are recommendations only, which must be checked **on site** for completeness and function. Please observe the applicable regulations and directives for design, installation and operation.*

Function description two-stage version

For reasons of modularity, compressor stage 2 refers to a separate heat pump stage 2 (type BWS). Heat pump stage 2 is not equipped with its own heat pump control unit, but with its own EEV controller to regulate the cooling circuit.
If the heating output required is greater than that of the heat pump (type BW, compressor stage 1), the heat pump control unit starts heat pump stage 2 (type BWS).

For optimised starting and stopping of heat pump stage 2, the heating outputs of the two compressor stages must be known. This is specified with parameter **"Output compressor stage 5030"**.

Heating circuit

Minimum flow rate

Heat pumps require a minimum heating water flow rate (see specification on page 242), which **must** be maintained. To ensure the minimum flow rate, install an overflow valve (or low loss header) in systems without a heating water buffer cylinder.

Note
A minimum flow rate is also required on the primary side (see specification, page 242).

Systems with small water volumes

For systems with small water volumes (for example, heating systems with radiators), use a heating water buffer cylinder to prevent excessive heat pump cycling (starting/stopping).

Function description for the system examples (cont.)

Systems with large water volumes

Systems with large water volumes (for example, underfloor heating systems) can operate without a heating water buffer cylinder. In these heating systems, install an overflow valve at the heating circuit distributor of the underfloor heating system that is furthest away from the heat pump. This safeguards the minimum flow rate, even in sealed heating circuits.
In conjunction with an underfloor heating system, install a temperature limiter (accessory, order no. 7151 728 or 7151 729) (for connection, see page 88).

Heating water buffer cylinder operated in parallel

Applications for a heating water buffer cylinder:
- Bridging power-OFF periods:
  At peak times, heat pumps may be switched off by your local power supply utility, subject to your electricity tariff. A heating water buffer cylinder supplies the heating circuits even during this power-OFF period.
- Constant flow rate through the heat pump:
  Heating water buffer cylinders provide hydraulic separation of the flow in the secondary and heating circuits. For example, the flow rate in the secondary circuit remains constant even if the heating circuit flow rate is reduced via thermostatic valves.
- Longer heat pump operating times

Because of the increased water volume of the heat source and the fact that it may have a separate shut-off facility, an additional (or larger) expansion vessel should be provided.

Note
The flow rate of the secondary pump should be greater than that of the heating circuit pumps.

Protect the heat pump in accordance with EN 12828 [or local regulations].

Systems without heating water buffer cylinder

To safeguard the minimum heating water flow rate (see specification from page 242), do **not** install a mixer in the heating circuit.

Low loss header

When using a low loss header, ensure that the flow rate on the heating circuit side is greater than the flow rate on the secondary side of the heat pump.
The heat pump control unit treats a low loss header like a small heating water buffer cylinder. The low loss header must therefore be configured as a heating water buffer cylinder in the control unit settings (see from page 204).

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Function description for the system examples (cont.)

Cooling operation

Cooling mode is possible either with one of the available heating circuits, or with a separate cooling circuit (e.g. chilled ceilings or fan convectors).

Types and configuration

Subject to system version, natural cooling, optionally with or without a mixer, or active cooling are possible. For natural cooling, the compressor is shut down and heat exchange occurs directly with the primary circuit. Active cooling uses the heat pump as a refrigeration unit, meaning a higher cooling capacity is possible than with natural cooling. Parameter **"Cooling 7100"** specifies the type of cooling mode. Active cooling is only possible outside a power-OFF period, and must be enabled separately by the system operator.

Enabling cooling mode
Operating instructions

Even if active cooling is selected and enabled, the control unit will initially start the natural cooling function. If the set room temperature cannot be achieved with this function, the compressor starts.
A mixer can only be used with natural cooling, and particularly in cooling mode on underfloor heating circuits, it keeps the flow temperature above the dew point. To ensure the transfer of the high cooling output in active cooling at all times, no mixer is provided.

Operating status

Cooling mode in the heating circuits is carried out in "Normal" and "Fixed val." operating statuses. The separate cooling circuit is additionally cooled in "Reduced" and "Only DHW" operating statuses. The latter enables continuous cooling of a room, e.g. a warehouse during the summer months.
The cooling output is subject to either weather-compensated control according to the heating or cooling curve, or room temperature-dependent control.

Note
*For cooling operation in the following cases, a room temperature sensor must be installed and enabled (parameter **"Remote control 2003"** set to **"1"**):*
- *Weather-compensated cooling mode with room influence*
- *Room temperature-dependent cooling mode*
- *"Active cooling"*

A room temperature sensor must always be installed for a separate cooling circuit.

Weather-compensated control

In weather-compensated cooling mode, the set flow temperature is calculated from the relevant set room temperature and the current outside temperature (long-term average) according to the cooling curve. Its level (**"Cooling curve level 7110"**) and slope (**"Cooling curve slope 7111"**) are adjustable.
Room influence

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Function description for the system examples (cont.)

Parameter **"Slope room hook-up 7104"** specifies the strength of the room influence for cooling mode.

Operating status "Normal"

The cooling output for the heating circuits is subject to either weather-compensated control according to the cooling curve, or room temperature-dependent control.

Operating status "Fixed val."

In operating status "Fixed val.", cooling occurs at the min. flow temperature **"Minimum flow temperature 7103"**.

DHW heating

In the delivered condition, DHW heating by the heat pump takes priority over the heating circuits.
The heat pump control unit switches the DHW circulation pump (**"DHW circ time prog"**) off during cylinder heating to prevent cylinder heating from being impaired.

Available booster heaters to reheat the DHW:
- External heat source
- Instantaneous heating water heater (on site)

The integral load manager in the heat pump control unit decides which heat sources to use for DHW heating. Generally the external heat source has priority over the instantaneous heating water heater (on site).

If one of the following criteria is met, the booster heaters begin cylinder heating:
- Cylinder temperature is below 3 °C (frost protection).
- Heat pump does not provide any heating output and actual temperature has fallen below set temperature at the top cylinder temperature sensor by more than **"Booster heater hysteresis 6008"**.

Note
The external heat source switches off as soon as the set value is reached at the top temperature sensor minus a hysteresis of 1 K.

Instantaneous heating water heater (on site)

An electric instantaneous heating water heater can be integrated in the heating water flow as an auxiliary heat source.


Installation instructions, instantaneous heating water heater

Function description for the system examples (cont.)

The heat pump control unit regulates this function (**"Inst. heating water heater 7900"**). The instantaneous heating water heater can be enabled separately for central heating (**"Heating with electro 7902"**) and DHW heating (**"DHW with e heating 6015"**).
If enabled via parameter **"Maximum stage, electric heating 7907"**, the heat pump control unit starts stages 1, 2 or 3 of the instantaneous heating water heater, subject to heat demand. As soon as the maximum flow temperature in the secondary circuit **"Maximum flow temperature 200E"** is reached, the heat pump control unit switches the instantaneous heating water heater off.

Parameter **"Stage at power-OFF 790A"** restricts the output stage of the instantaneous heating water heater for the duration of the power-OFF period. To limit the total power consumption, the heat pump control unit stops the instantaneous heating water heater for a few seconds directly before the compressor starts. Each stage is subsequently started individually one after the other in intervals of 10 s.
If the instantaneous heating water heater is on and the differential between flow and return temperatures in the secondary circuit does not rise by at least 1 K within 24 h, the heat pump control unit displays a fault message.

External heat source

The heat pump control unit enables the heat pump to operate in dual mode with an external heat source, e.g. oil boiler (**"External heat source 7B00"**).
The external heat source is hydraulically connected to let the heat pump also be used as a return temperature raising facility for the boiler. System separation is provided either with a low loss header or heating water buffer cylinder.
For optimum heat pump operation, the external heat source must be integrated via a mixer into the heating water flow. A quick reaction is achieved by directly controlling this mixer via the heat pump control unit.

If the outside temperature (long-term average) is below the **"Dual-mode temperature 7B02"**, the heat pump control unit starts the external heat source. In case of direct heat demand from the consumers (e.g. for frost protection or if the heat pump is faulty), the external heat source is also started above the dual mode temperature.
In addition, the external heat source can be enabled for DHW heating (**"External heat source for DHW 7B0D"**).

Note
*The heat pump control unit does **not** contain any safety function for the external heat source. To prevent excessive temperatures in the heat pump flow and return in case of a fault, high limit safety cut-outs **must** be provided to shut down the external heat source and the secondary pump(s) (switching threshold in each case 70 °C).*

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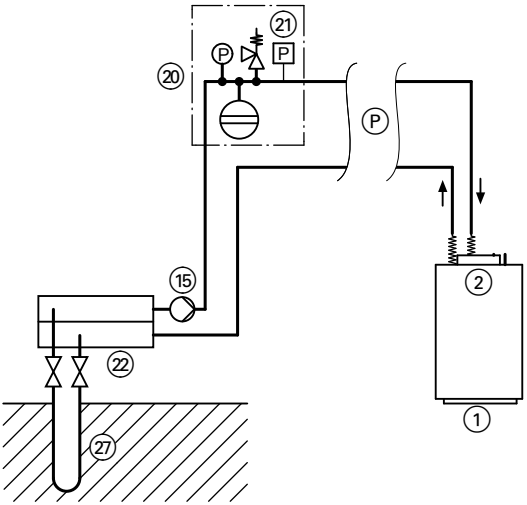
Function description for the system examples (cont.)

Power-OFF

It is possible for the power supply utility to shut down the compressor and instantaneous heating water heater (see from page 108). The ability to carry out such a shutdown may be a power supply utility requirement for providing a lower tariff.

This must **not** shut down the power supply to the heat pump control unit.

Primary circuit, type BW (brine/water)



Ⓟ Primary circuit interface (see system examples)

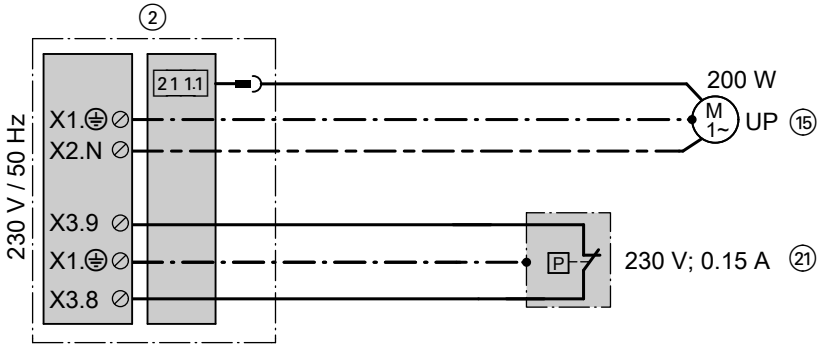
Primary circuit, type BW (brine/water) (cont.)

Required Equipment

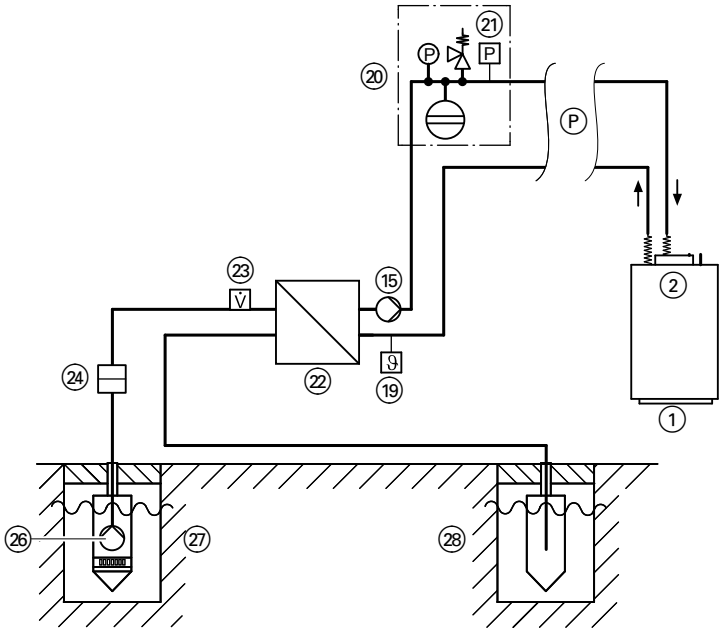
Pos.	Description
①	Heat pump
②	Heat pump control unit
⑮	Primary pump
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Brine distributor for geothermal probes/collectors
㉗	Geothermal probes/collectors

Electrical connection

For further information regarding the PCBs, see from page 220.



Primary circuit, type WW (water/water)



Ⓟ Interface, primary circuit

Equipment required

Pos.	Description
①	Heat pump
②	Heat pump control unit
⑮	Primary pump
⑲	Frost stat, primary circuit
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Separating heat exchanger, primary circuit
㉓	Flow limiter, well circuit (remove jumper when connecting)
㉔	Dirt trap
㉖	Well pump (suction pump for groundwater; connect via on-site contactor with fuse protection) ■ 230 V connection: See page 25 ■ 400 V connection: See page 26
㉗	Delivery well
㉘	Return well

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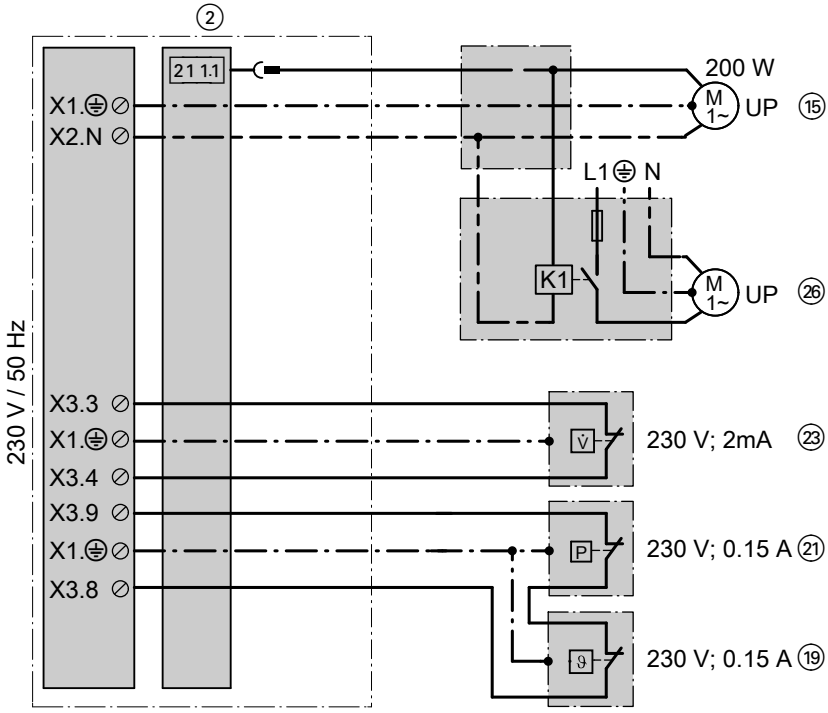
Primary circuit, type WW (water/water) (cont.)

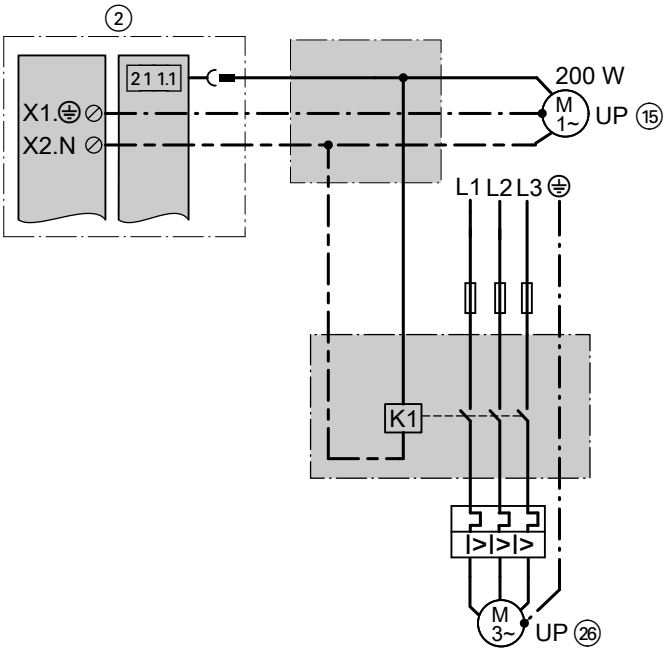
Electrical connection

For further information regarding the PCBs, see from page 220.



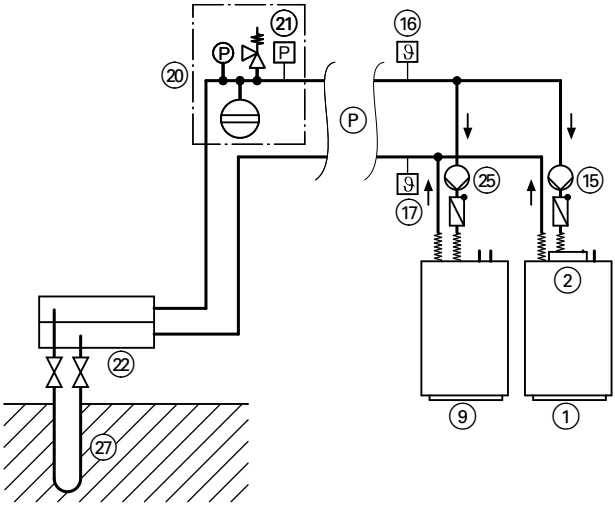
Primary circuit, type WW (water/water) (cont.)

Well pump on-site connection 400 V~



Primary circuit, type BW + BWS (two-stage version)

With two primary pumps



Ⓟ Primary circuit interface (see system examples)

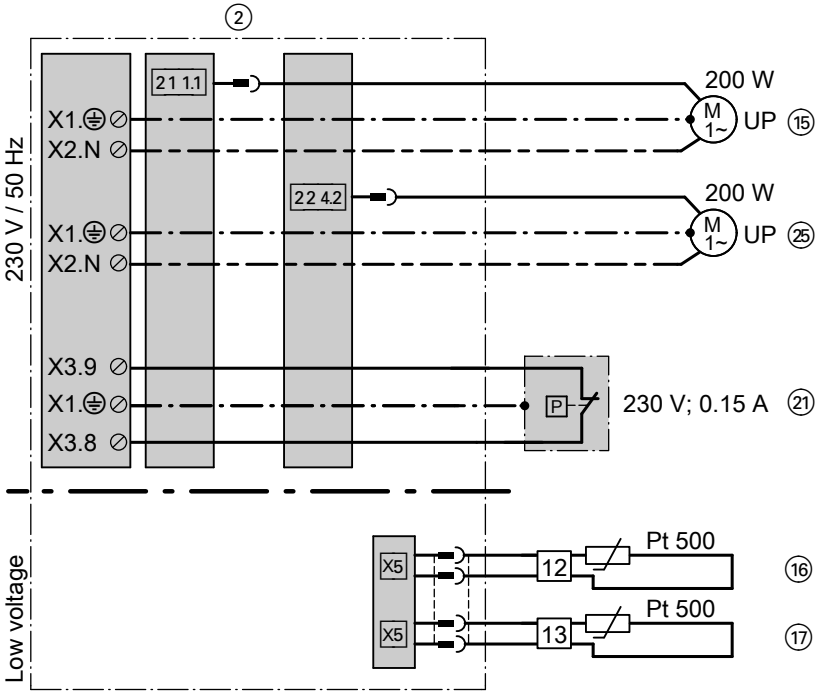
Equipment required

Pos.	Description
①	Heat pump stage 1 (type BW)
②	Heat pump control unit
⑨	Heat pump stage 2 (type BWS)
⑮	Primary pump (heat pump stage 1, type BW)
⑯	Flow temperature sensor, primary circuit
⑰	Return temperature sensor, primary circuit
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Brine distributor, geothermal probes/collectors
㉕	Primary pump (heat pump stage 2, type BWS)
㉗	Geothermal probes/collectors

Electrical connection

For further information regarding the PCBs, see from page 220.

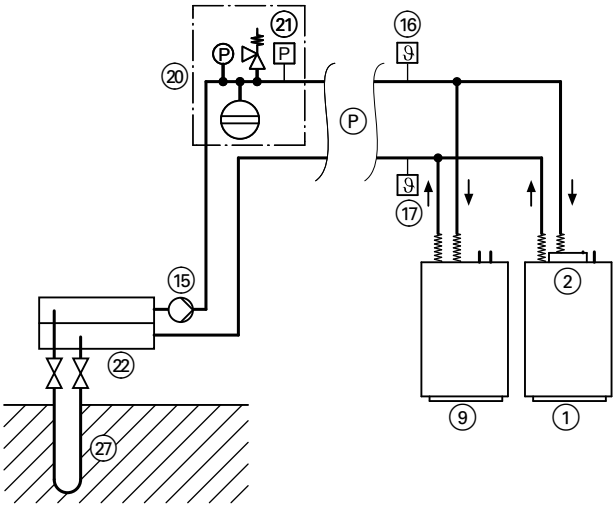
Primary circuit, type BW + BWS (two-stage… (cont.)



With a common primary pump

Note
If types BW and BWS are installed with different rated outputs, the different flow rates mean that two primary pumps must be used (see page 27).

Primary circuit, type BW + BWS (two-stage… (cont.)



Ⓟ Interface, primary circuit

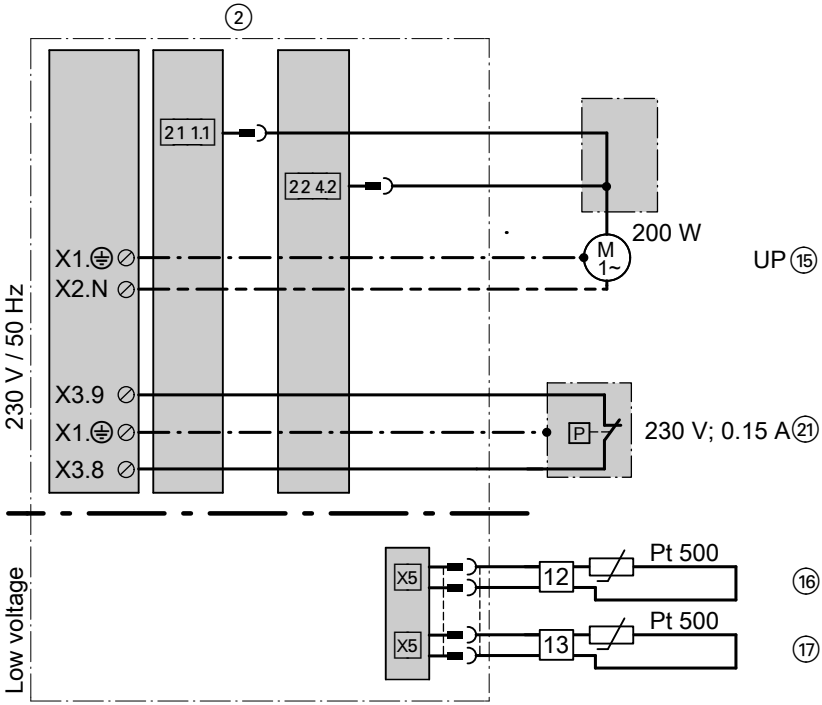
Equipment required

Pos.	Description
①	Heat pump stage 1 (type BW)
②	Heat pump control unit Vitotronic 200, type WO1A
⑨	Heat pump stage 2 (type BWS)
⑮	Common primary pump
⑯	Primary circuit flow temperature sensor (for installation, see page 84)
⑰	Primary circuit return temperature sensor (for installation, see page 84)
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Brine distributor, geothermal probes/collectors
㉗	Geothermal probes/collectors

Electrical connection

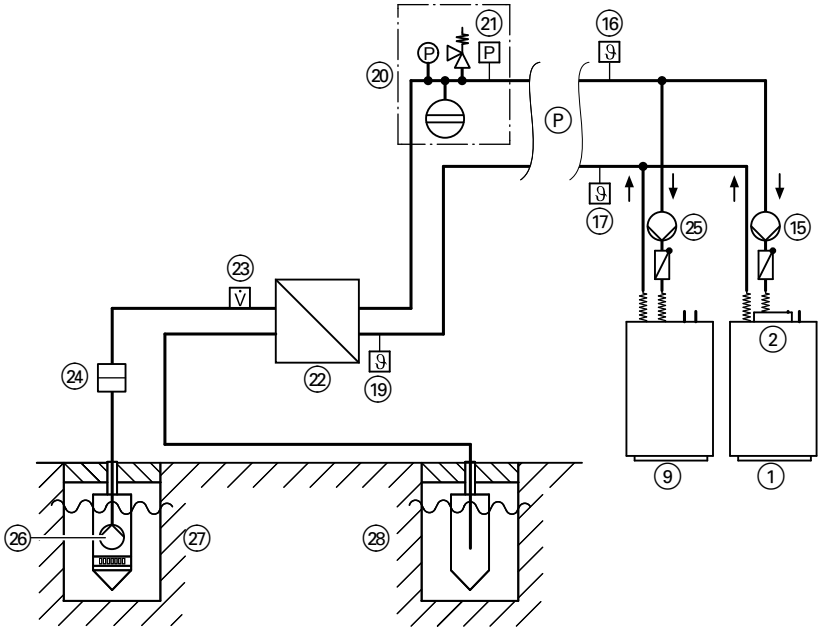
For further information regarding the PCBs, see from page 220.

Primary circuit, type BW + BWS (two-stage… (cont.)



Primary circuit, type WW + WWS (two-stage version)

With two primary pumps



Ⓟ Primary circuit interface (see system examples)

Primary circuit, type WW + WWS (two-stage… (cont.)

Equipment required

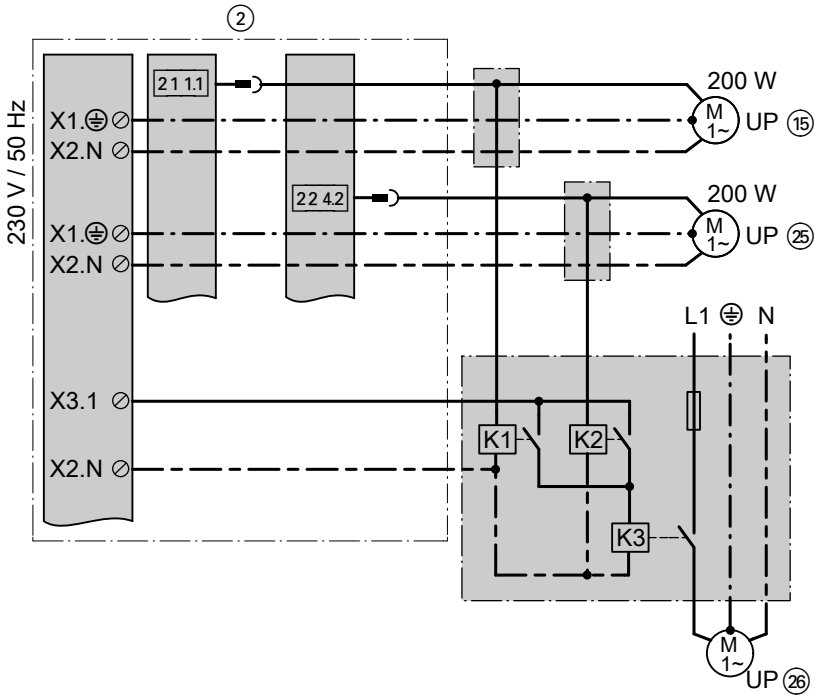
Pos.	Description
①	Heat pump stage 1 (type WW)
②	Heat pump control unit
⑨	Heat pump stage 2 (type WWS)
⑮	Primary pump (heat pump stage 1, type WW)
⑯	Primary circuit flow temperature sensor (for installation, see page 84)
⑰	Primary circuit return temperature sensor (for installation, see page 84)
⑲	Frost stat, primary circuit
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Heat exchanger, primary circuit
㉓	Flow limiter, well circuit (remove jumper before connecting)
㉔	Dirt trap
㉕	Primary pump (heat pump stage 2, type WWS)
㉖	Well pump (suction pump for groundwater; connect via on-site contactor with fuse protection) ■ 230 V connection: See page 33 ■ 400 V connection: See pages 38, 34.
㉗	Delivery well
㉘	Return well

Electrical connection

For further information regarding the PCBs, see from page 220.

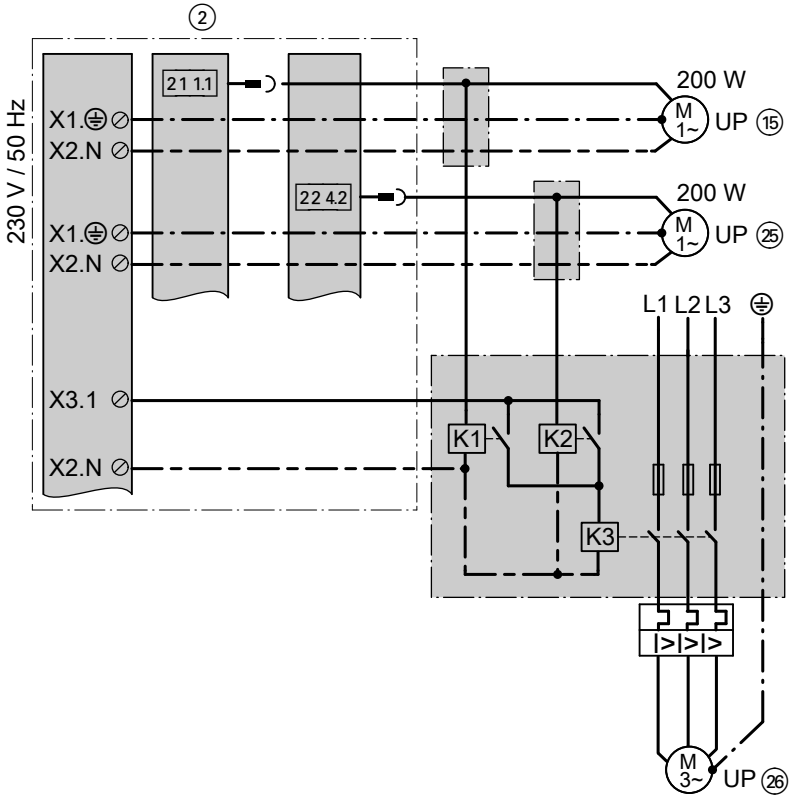
Primary circuit, type WW + WWS (two-stage… (cont.)

Well pump on-site connection 230 V~



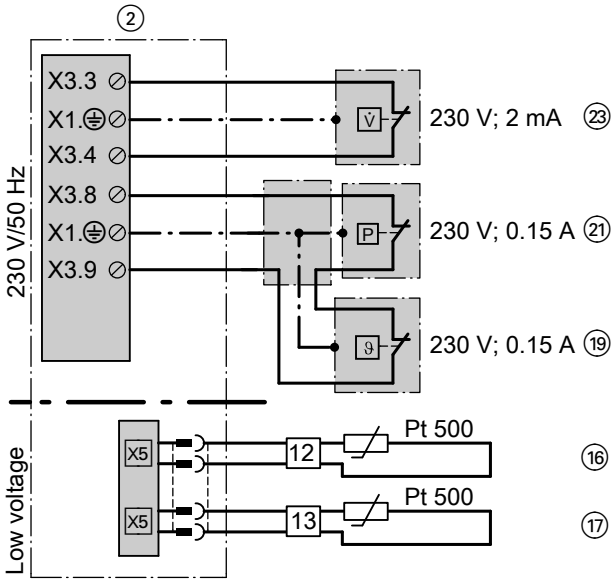
Primary circuit, type WW + WWS (two-stage… (cont.)

Well pump on-site connection 400 V



Primary circuit, type WW + WWS (two-stage… (cont.)

Connecting the sensors and limiters

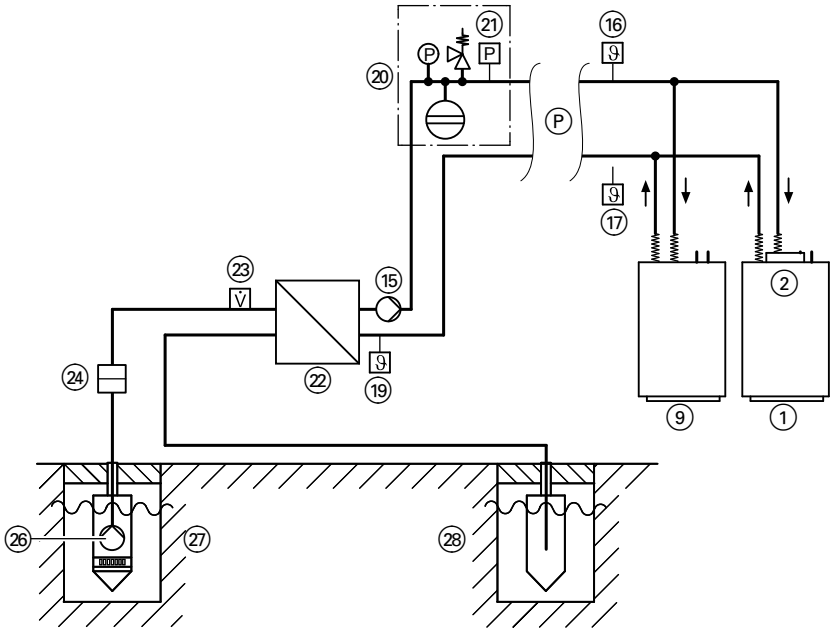


With a common primary pump

Note

If types WW and WWS are installed with different rated outputs, the different flow rates mean that two primary pumps must be used (see page 31).

Primary circuit, type WW + WWS (two-stage… (cont.)



Ⓟ Interface, primary circuit

Primary circuit, type WW + WWS (two-stage… (cont.)

Equipment required

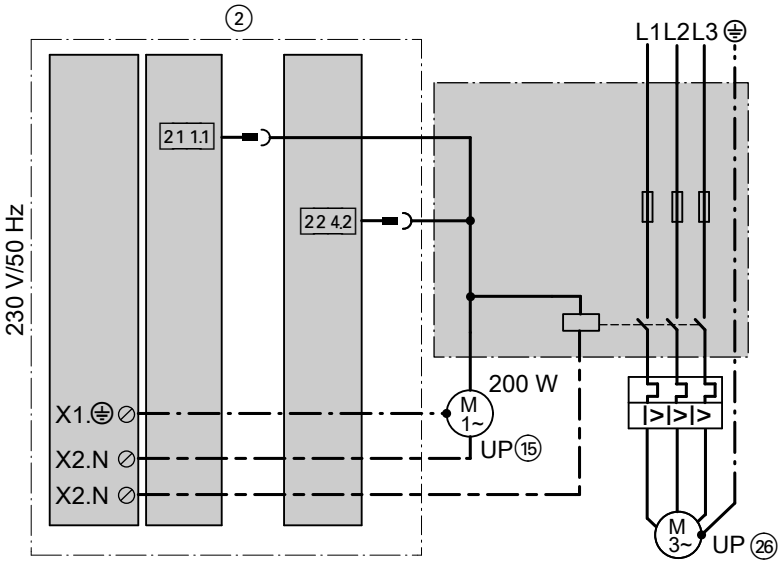
Pos.	Description
①	Heat pump stage 1 (type WW)
②	Heat pump control unit
⑨	Heat pump stage 2 (type WWS)
⑮	Common primary pump
⑯	Primary circuit flow temperature sensor (for installation, see page 84)
⑰	Primary circuit return temperature sensor (for installation, see page 84)
⑲	Frost stat, primary circuit
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Heat exchanger, primary circuit
㉓	Flow limiter, well circuit (remove jumper before connecting)
㉔	Dirt trap
㉖	Well pump (suction pump for groundwater; connect via on-site contactor with fuse protection) ■ 230 V connection: See page 33 ■ 400 V connection: See pages 38, 34.
㉗	Delivery well
㉘	Return well

Electrical connection

For further information regarding the PCBs, see from page 220.

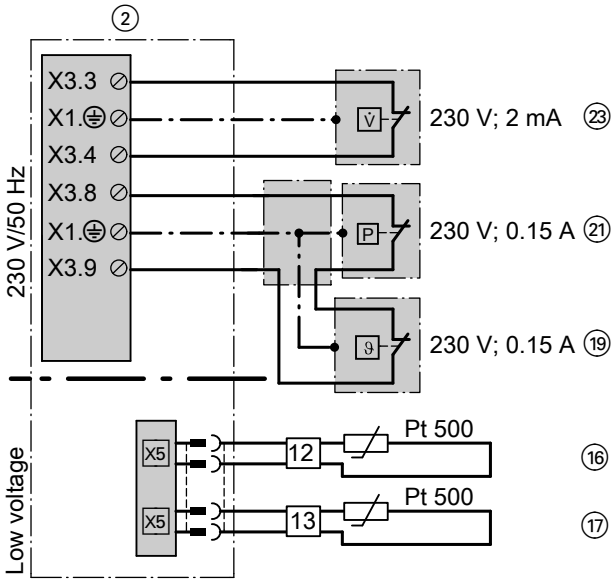
Primary circuit, type WW + WWS (two-stage… (cont.)

Well pump on-site connection 400 V



Primary circuit, type WW + WWS (two-stage… (cont.)

Connecting the sensors and limiters



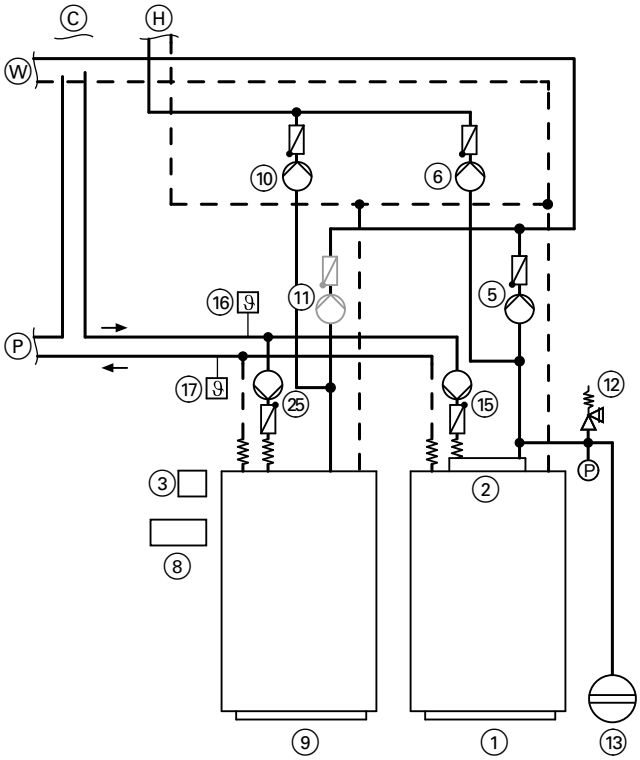
Integration of the two-stage version in the system examples

Note

- *Every partial scheme can be integrated into the system examples via the interfaces indicated.*
- *Connect return DHW cylinder only to heat pump, type BW.*
- *Two-stage heat pump cascade: For the two-stage heat pump cascade, the lead appliance and lag heat pumps each comprise a heat pump (type BW) and heat pump stage 2 (type BWS). The electrical connection is made at the heat pump (type BW) (via the KM BUS at external extension H1) as per page 100.*

Integration of the two-stage version in the… (cont.)

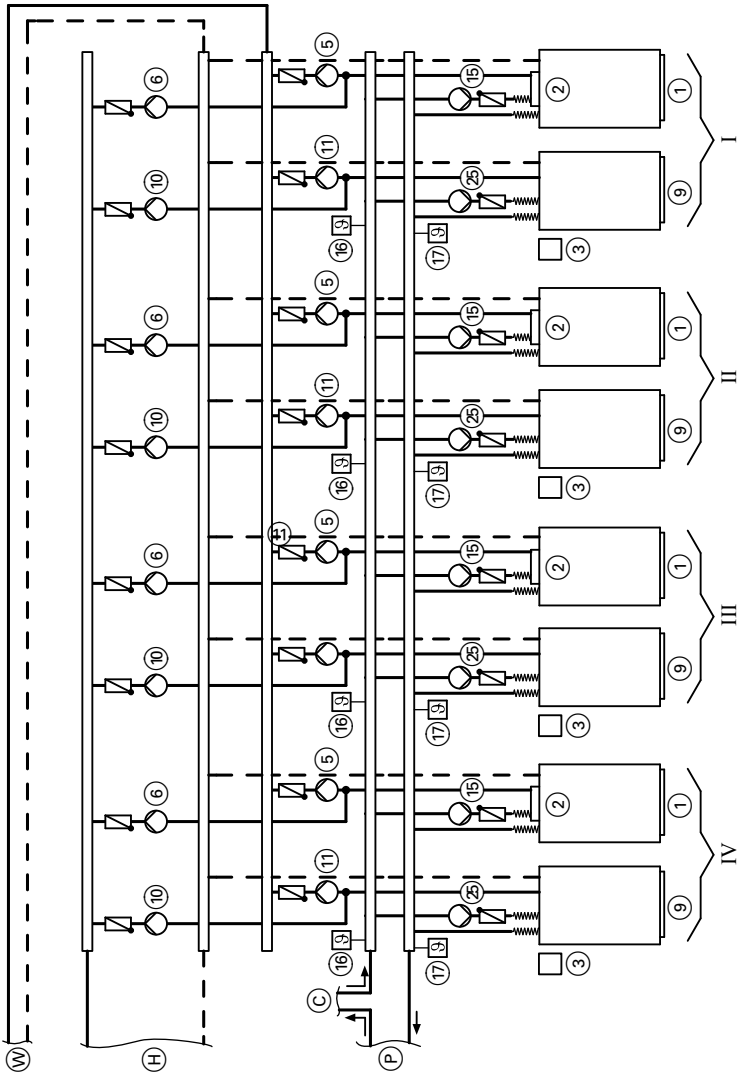
Two-stage heat pump



Ⓒ Cooling interface
Ⓗ Heating interface
Ⓟ Primary circuit interface (see primary circuit)
Ⓦ DHW interface (see also DHW heating)

Integration of the two-stage version in the… (cont.)

Two-stage heat pump cascade



Ⓒ Cooling interface
Ⓗ Heating interface
Ⓟ Primary circuit interface
Ⓦ DHW interface

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Integration of the two-stage version in the… (cont.)

I Lead appliance (two-stage) of the heat pump cascade
II to IV Lag heat pump (two-stage) 1 to 3

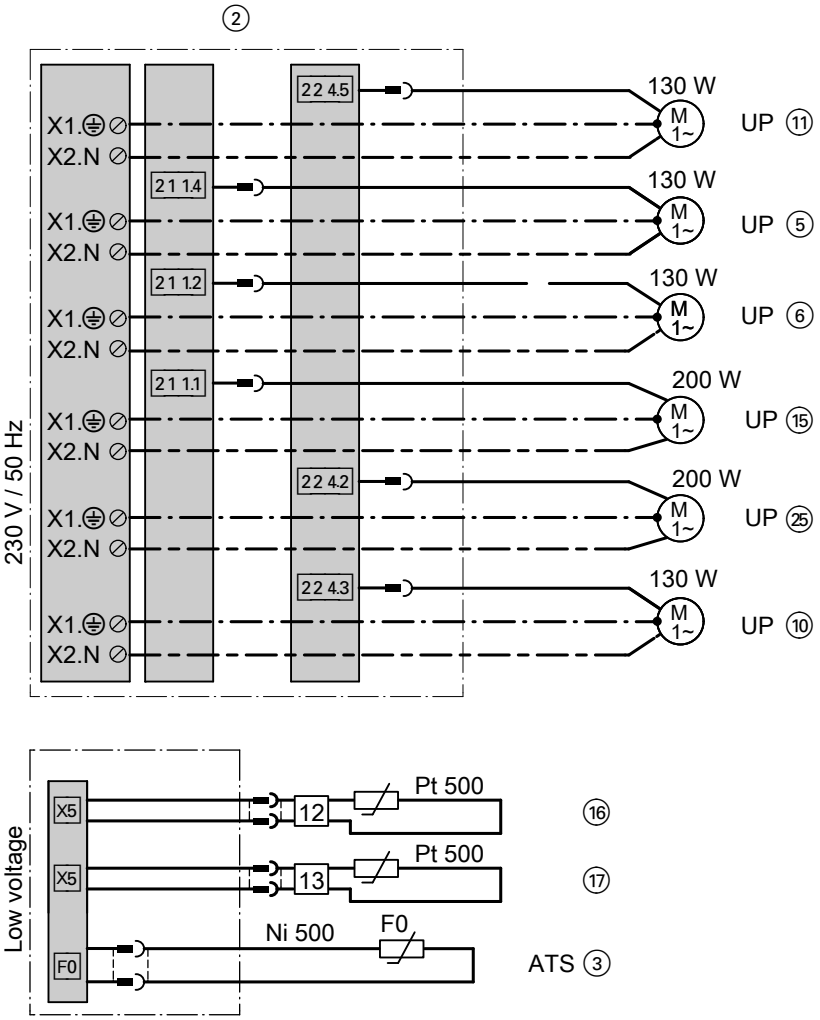
Equipment required

Pos.	Description
	Heat source
①	Heat pump stage 1
	Note *For recommended compressor power cable, see page 15, on-site fuse protection (see from page 104 and 242)*
③	Outside temperature sensor
②	Heat pump control unit (for the power supply, use a 3 x 1.5 mm^2 cable; on-site fuse protection $\leq$ 16 A)
⑤	Circulation pump for cylinder heating (heating water side), heat pump stage 1
⑥	Secondary pump, heat pump stage 1
⑨	Heat pump stage 2
	Note *For recommended compressor power cable, see page 15, on-site fuse protection (see from page 104 and 242)*
⑩	Secondary pump, heat pump stage 2
⑪	Circulation pump for cylinder heating (heating water side), heat pump stage 2
⑮	Primary pump, heat pump stage 1
⑯	Primary circuit flow temperature sensor (for installation, see page 84)
⑰	Primary circuit return temperature sensor (for installation, see page 84)
㉕	Primary pump, heat pump stage 2

Electrical connection

For further information regarding the PCBs, see from page 220.

Integration of the two-stage version in the… (cont.)



Required parameters

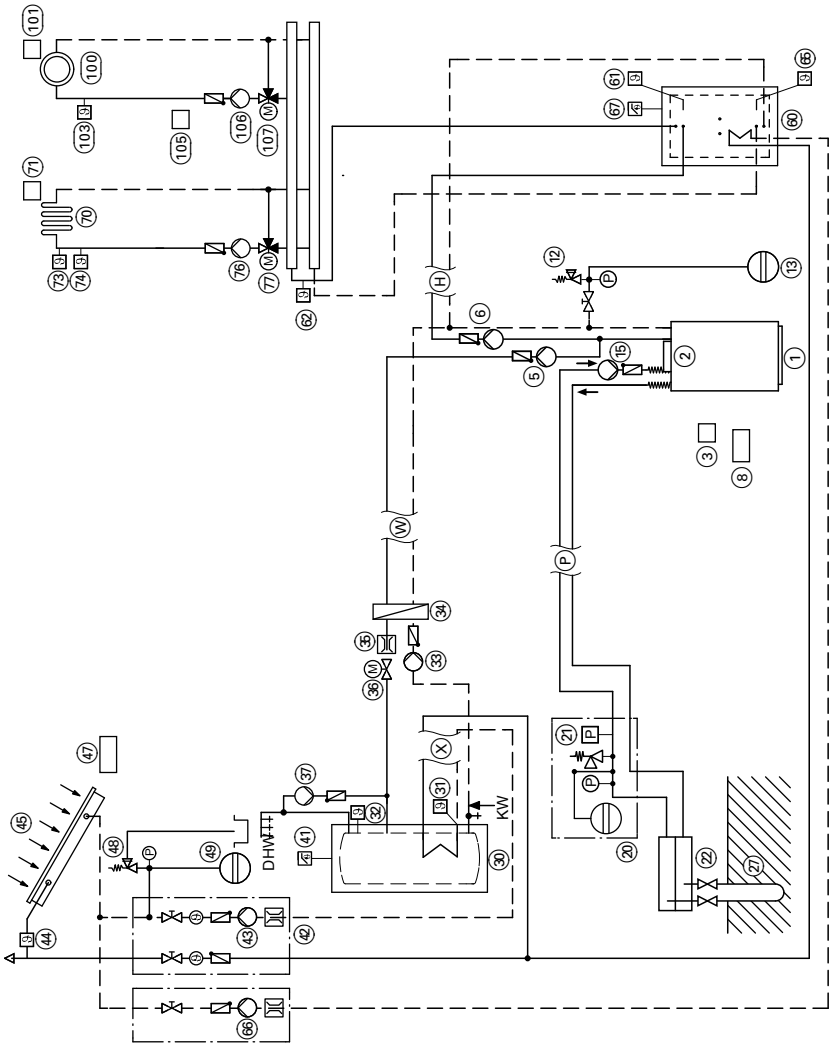
The additional parameters for the heat pump cascade are set during commissioning by the certified heat pump contractor.

System example 1

Select system scheme 8 (see page 173)
- Single stage heat pump, type BW
- 1 underfloor heating circuit with mixer (M2)
- 1 radiator circuit with mixer (M3)
- DHW heating with a cylinder primary store
- Solar thermal system
- Heating water buffer cylinder

Note
This scheme is a basic example without shut-off valves or safety equipment. This does not replace the local technical engineering task.

System example 1 (cont.)



Ⓒ Cooling interface
Ⓗ Heating interface
Ⓟ Primary circuit interface (see primary circuit)
Ⓦ DHW interface (see also DHW heating)
Ⓧ Solar interface or external heat source (see system examples)

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System example 1 (cont.)

Pos.	Description
	Heat source
①	Heat pump
②	Heat pump control unit
③	Outside temperature sensor
⑤	Circulation pump for cylinder heating (heating water side)
⑥	Secondary pump
⑧	KM BUS distributor
⑫	Safety equipment block with safety assembly
⑬	Expansion vessel
	Primary circuit
⑮	Primary pump
⑯	Primary circuit flow temperature sensor (integrated into heat pump)
⑰	Primary circuit return temperature sensor (integrated into heat pump)
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Brine distributor for geothermal probes/geothermal collectors
㉗	Geothermal probe/geothermal collector
	DHW heating with a primary store system
㉚	DHW cylinder
㉛	Solar cylinder temperature sensor (connection S2 to Vitosolic)
㉜	Cylinder temperature sensor (connection to heat pump control unit)
㉝	Cylinder primary pump (DHW side)
㉞	Plate heat exchanger
㉟	Flow limiter
㊱	Motorised two-way valve, normally closed
㊲	DHW circulation pump
	DHW heating with a solar thermal system
㊶	High limit safety cut-out for DHW cylinder to switch off the solar circuit pump R1 ㊸
㊷	Solar-Divicon
㊸	Solar circuit pump R1
㊹	Collector temperature sensor (Vitosolic standard delivery, connection S1)
㊺	Solar collectors
㊼	Vitosolic 200 (observe separate installation instructions)
㊽	Safety equipment block with safety assembly
㊾	Expansion vessel

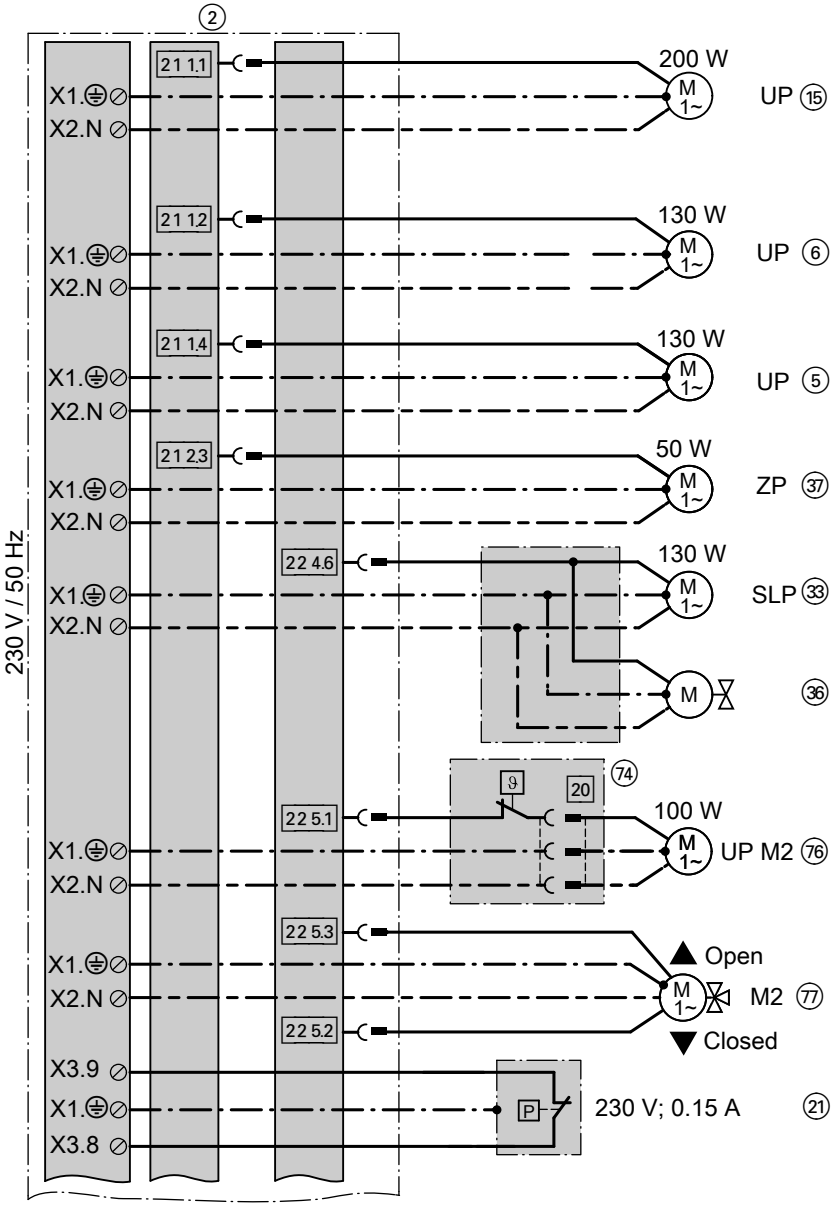
System example 1 (cont.)

Pos.	Description
	Heating water buffer cylinder
⑥⓪	Heating water buffer cylinder
⑥①	Buffer cylinder temperature sensor
⑥②	System flow temperature sensor
⑥⑤	Solar buffer temperature sensor (connection S4 to Vitosolic)
⑥⑥	Solar circuit pump R4 for heating up the heating water buffer cylinder
⑥⑦	High limit safety cut-out for heating water buffer cylinder to switch off the solar circuit pump R4 ⑥⑥
	Heating circuit with mixer (M2)
⑦⓪	Underfloor heating circuit with directly controlled mixer motor
⑦①	Vitotrol 200 remote control (accessory)
⑦③	Flow temperature sensor
⑦④	Temperature limiter as maximum limiter for underfloor heating systems
⑦⑥	Heating circuit pump
⑦⑦	Mixer motor - three-way mixer
	Heating circuit with mixer (M3)
①⓪⓪	Radiator heating circuit with mixer, controlled via KM BUS
①⓪①	Vitotrol 200 remote control (accessory)
①⓪③	Flow temperature sensor
①⓪⑤	Extension kit for one heating circuit with mixer
①⓪⑥	Heating circuit pump
①⓪⑦	Mixer motor - three-way mixer

Electrical connection

For further information regarding the PCBs, see from page 220.

System example 1 (cont.)



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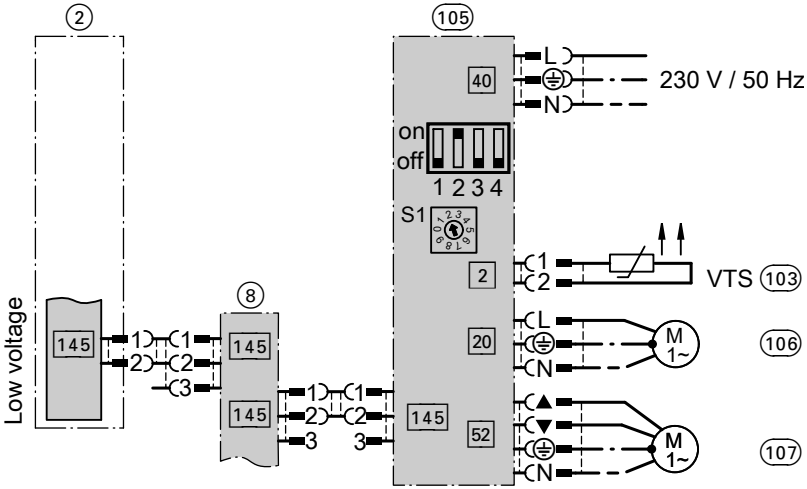
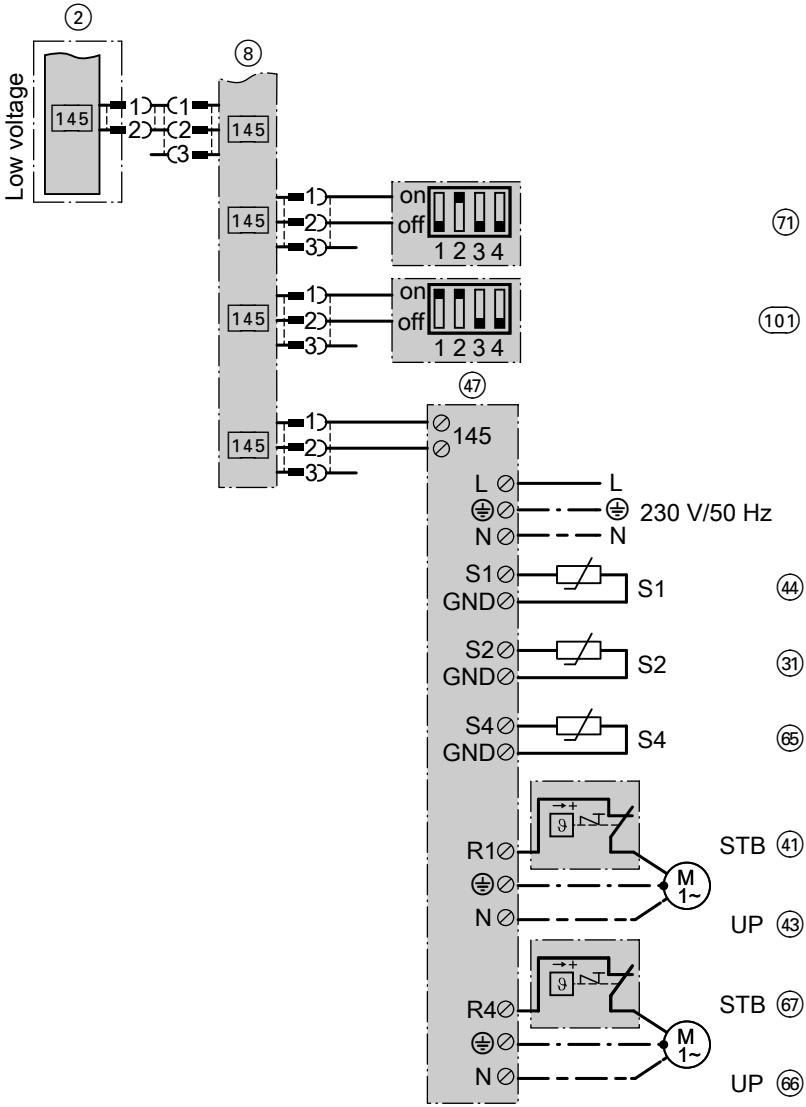
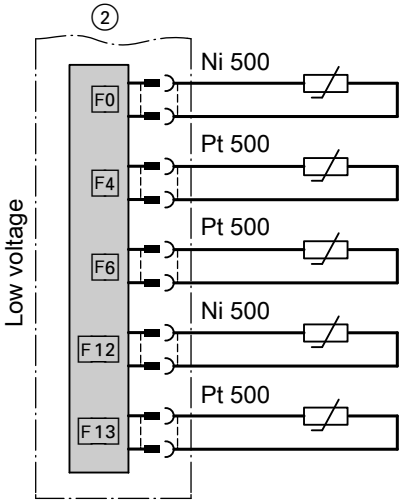
System example 1 (cont.)



System example 1 (cont.)



System example 1 (cont.)



ATS ③

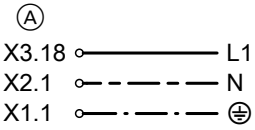
PTS ⑥①

STS ③②

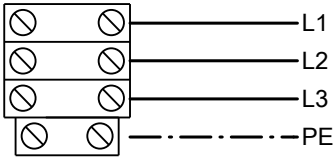
VTS M2 ⑦③

VTS ⑥②

Control unit power supply



Compressor power supply



Ⓐ Mains terminals on the cross connect PCB

System example 1 (cont.)

Required parameters

Parameter	Setting
"System definition" ■ **"System scheme 7000"**	**"8"**
"Solar" ■ **"Solar control unit type 7A00"** ***Note*** *Vitosolic parameters must be set (see Vitosolic installation and service instructions)*	**"2"**
For accessories (if installed): DHW circulation pump **"Heating circuit 2"** ■ **"Remote control 3003"** **"Heating circuit 3"** ■ **"Remote control 4003"**	Set switching times (see operating instructions) **"1"** **"1"**

System example 2

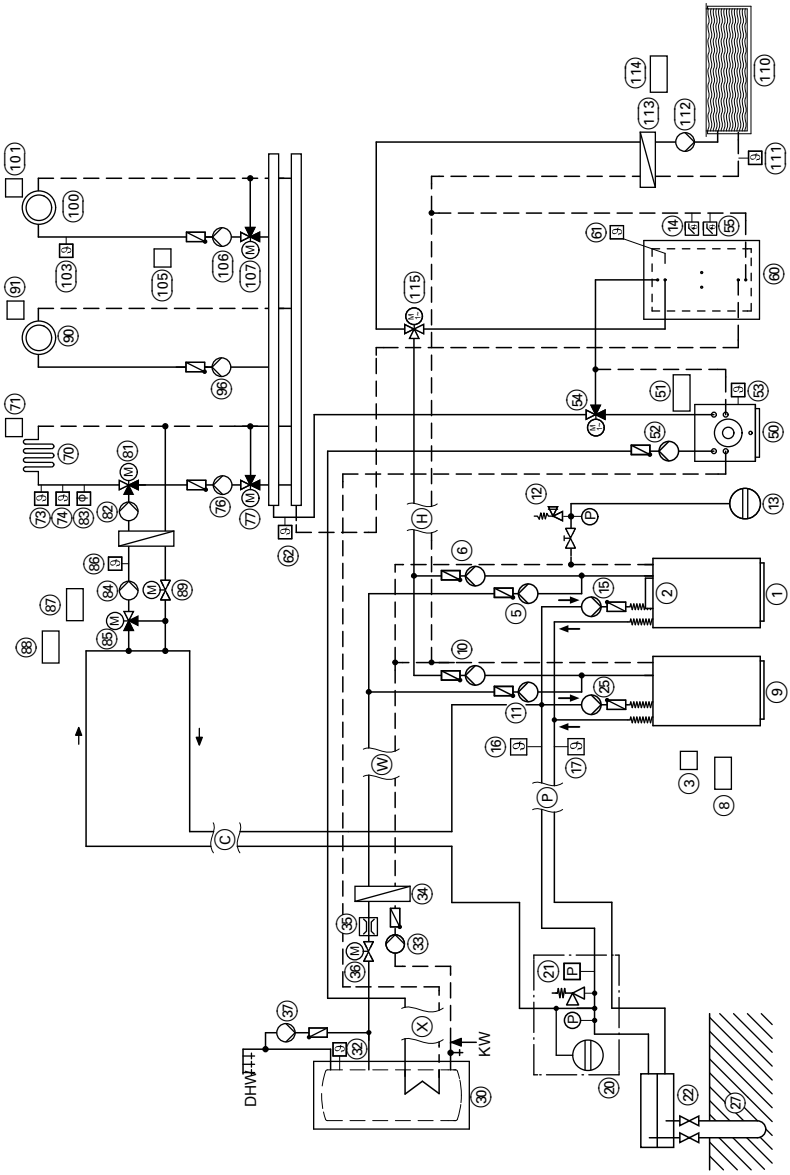
Select system scheme 10 (see page 173)

- Two stage heat pump type BW/BWS
- 2 primary pumps
- 1 heating circuit without mixer (A1)
- 2 heating circuits with mixer (M2, M3)
- External heat source for heating and DHW
- DHW heating with a cylinder primary store
- Solar thermal system
- Heating water buffer cylinder
- Cooling function "natural cooling" (on site) at heating circuit M2
- Swimming pool

Note

This scheme is a basic example without shut-off valves or safety equipment. This does not replace the local technical engineering task.

System example 2 (cont.)



Ⓒ Cooling interface
Ⓗ Heating interface
Ⓟ Primary circuit interface (see primary circuit)

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System example 2 (cont.)

Ⓦ DHW interface (see also DHW heating)
Ⓧ Solar interface or external heat source (see system examples)

Pos.	Description
	Heat source
①	Heat pump stage 1 (type BW)
②	Heat pump control unit
③	Outside temperature sensor
⑤	Circulation pump for cylinder heating (heating water side) for heat pump stage 1 (type BW)
⑥	Secondary pump for heat pump stage 1 (type BW)
⑧	KM BUS distributor
⑨	Heat pump stage 2 (BWS)
⑩	Secondary pump for heat pump stage 2 (type BWS)
⑪	Circulation pump for cylinder heating (heating water side) for heat pump stage 2 (type BWS)
⑫	Safety equipment block with safety assembly
⑬	Expansion vessel
	Primary circuit
⑮	Primary pump for heat pump stage 1 (type BW)
⑯	Primary circuit flow temperature sensor (installation only required for two stage heat pump, see page 84)
⑰	Primary circuit return temperature sensor (installation only required for two stage heat pump, see page 84)
㉕	Primary pump for heat pump stage 2 (type BWS)
⑳	Brine accessory pack
㉑	Pressure switch, primary circuit
㉒	Brine distributor for geothermal probes/geothermal collectors
㉗	Geothermal probe/geothermal collector

System example 2 (cont.)

Pos.	Description
	DHW heating with a primary store system
㉚	DHW cylinder
㉜	Cylinder temperature sensor
㉝	Cylinder primary pump (DHW side)
㉞	Plate heat exchanger
㉟	Flow limiter
㊱	Motorised two-way valve, normally closed
㊲	DHW circulation pump
	External heat source
⑭	High limit safety cut-out (STB) to switch off the secondary pumps ⑥ and ⑩
㊿	External heat source, e.g. oil boiler
㊶	External heat source demand (connection to external heat source)
㊷	Circulation pump for cylinder reheating
㊸	Boiler water temperature sensor (connection to heat pump control unit)
㊹	Directly controlled mixer motor
㊺	High limit safety cut-out 70 °C for shutting down the external heat source (on site)
	Heating water buffer cylinder
㊵	Heating water buffer cylinder
㊶	Buffer cylinder temperature sensor
㊷	System flow temperature sensor

System example 2 (cont.)

Pos.	Description
	Natural cooling function (NC)
	Note
	All required components (with a suitably designed plate heat exchanger) for the cooling circuit must be provided on site.
(81)	Three-way diverter valve
	Note
	When using a three-way diverter valve without spring-loaded return, at contact [52]2 ▼ (from pos. (87)) "L1" must be connected (see for example terminal strip X3, page 225).
(82)	Secondary cooling circuit pump
(83)	Contact humidistat
(84)	Primary cooling circuit pump
(85)	Mixer motor - three-way mixer
(86)	Frost stat
(87)	Extension kit for NC
(88)	Extension kit for heating circuit (cooling circuit) with mixer
(89)	Motorised two-way valve, normally closed
	Note
	When using a two-way diverter valve without spring-loaded return, at contact [52]1 ▼ (from pos. (87)) "L1" must be connected (see for example terminal strip X3, page 225).
	Heating circuit without mixer (A1)
(90)	Radiator heating circuit
(91)	Vitotrol 200 remote control
(96)	Heating circuit pump
	Heating circuit with mixer (M2)
(70)	Underfloor heating circuit with directly controlled mixer motor
(71)	Vitotrol 200 remote control (accessory)
(73)	Flow temperature sensor
(74)	Temperature limiter as maximum limiter for underfloor heating systems
(76)	Heating circuit pump
(77)	Mixer motor - three-way mixer

System example 2 (cont.)

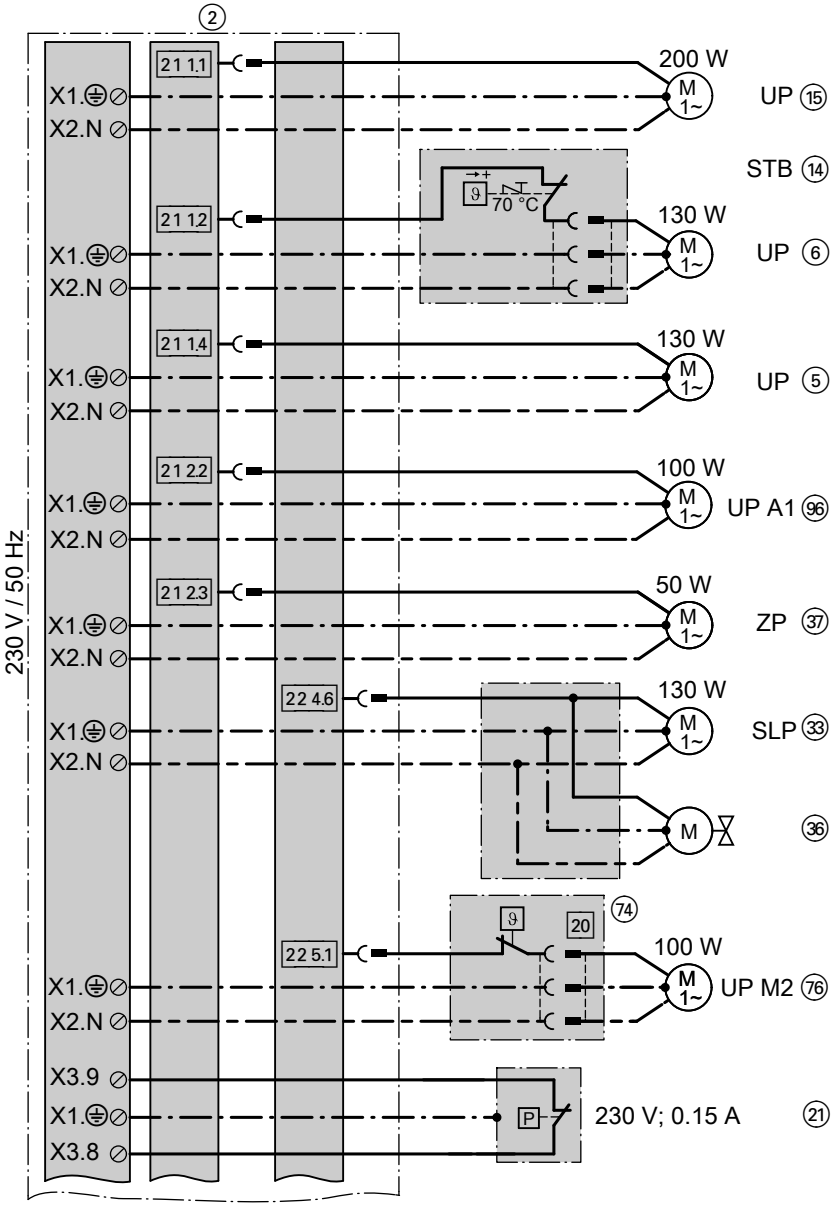
Pos.	Description
	Heating circuit with mixer (M3)
(100)	Radiator heating circuit with mixer, controlled via KM BUS
(101)	Vitotrol 200 remote control (accessory)
(103)	Flow temperature sensor
(105)	Extension kit for one heating circuit with mixer
(106)	Heating circuit pump
(107)	Mixer motor - three-way mixer
	Swimming pool
(110)	Swimming pool
(111)	Thermostat for controlling the swimming pool temperature
(112)	Circulation pump for swimming pool heating
(113)	Plate heat exchanger
(114)	External extension H1 (only 1 external extension H1 can be connected to the heat pump)
(115)	Three-way diverter valve (zero volt: Heating the heating water buffer cylinder)

Note
The additional parameters for two-stage operation are set during commissioning by the certified heat pump contractor.

Electrical connection

For further information regarding the PCBs, see from page 220.

System example 2 (cont.)



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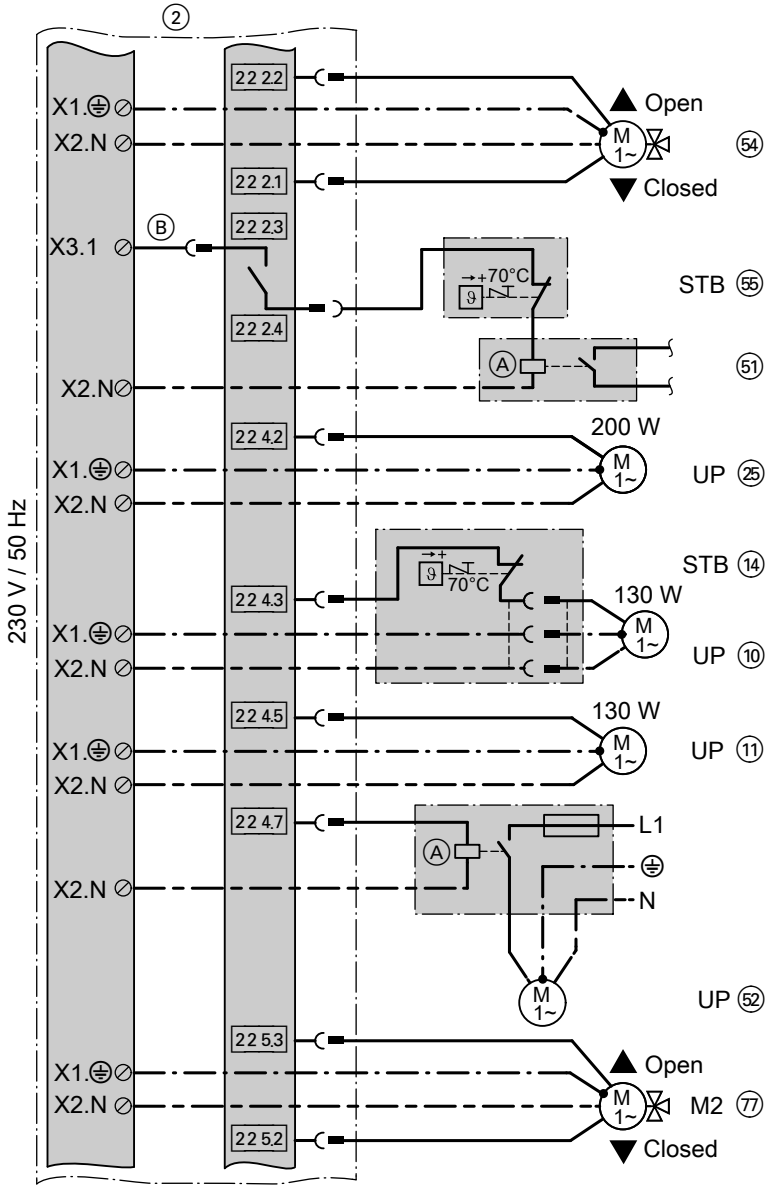
System example 2 (cont.)



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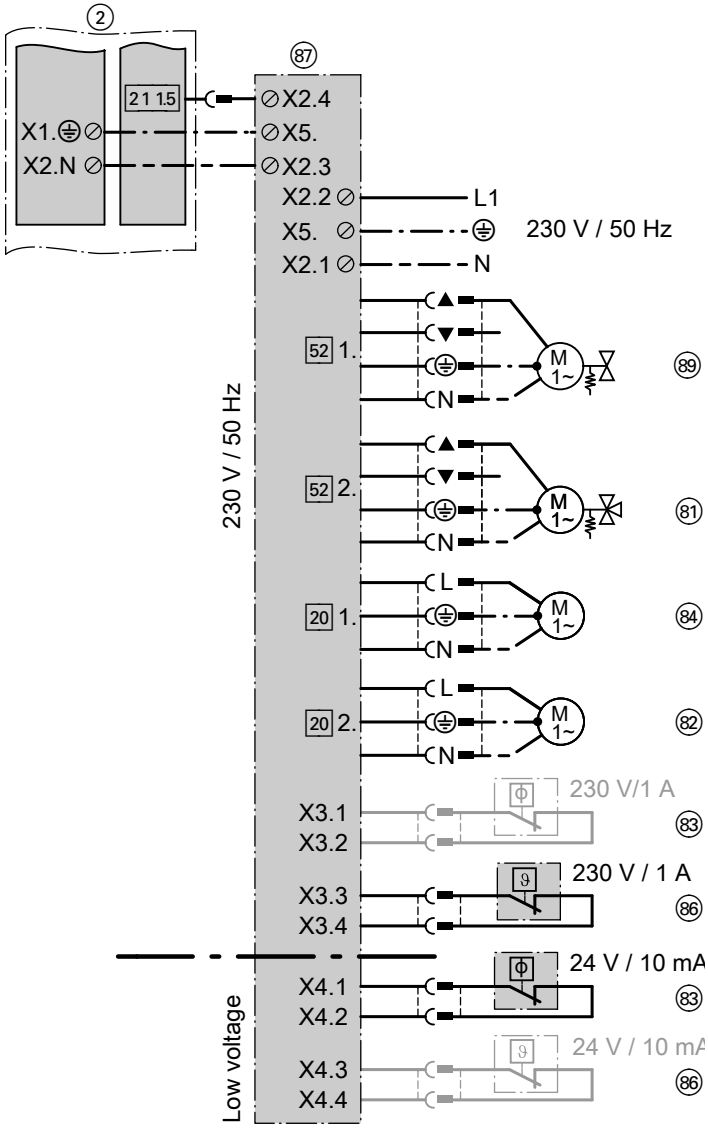
System example 2 (cont.)

Ⓐ On-site contactor
Ⓑ Use jumper from X3.1 to 222.3



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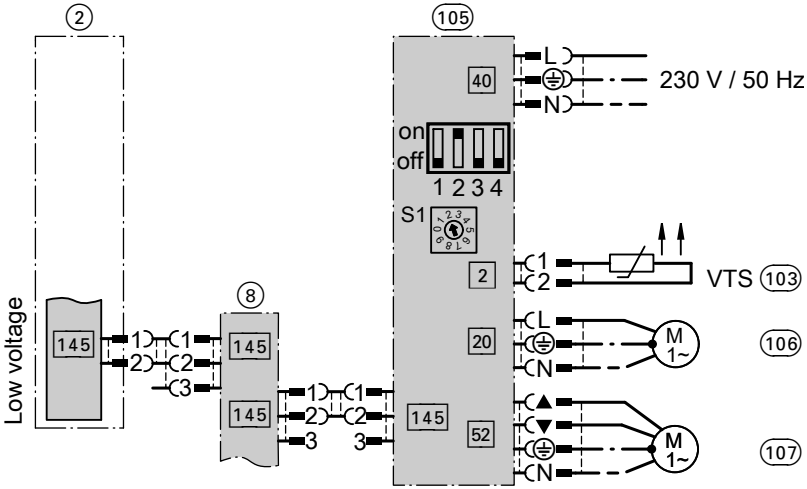
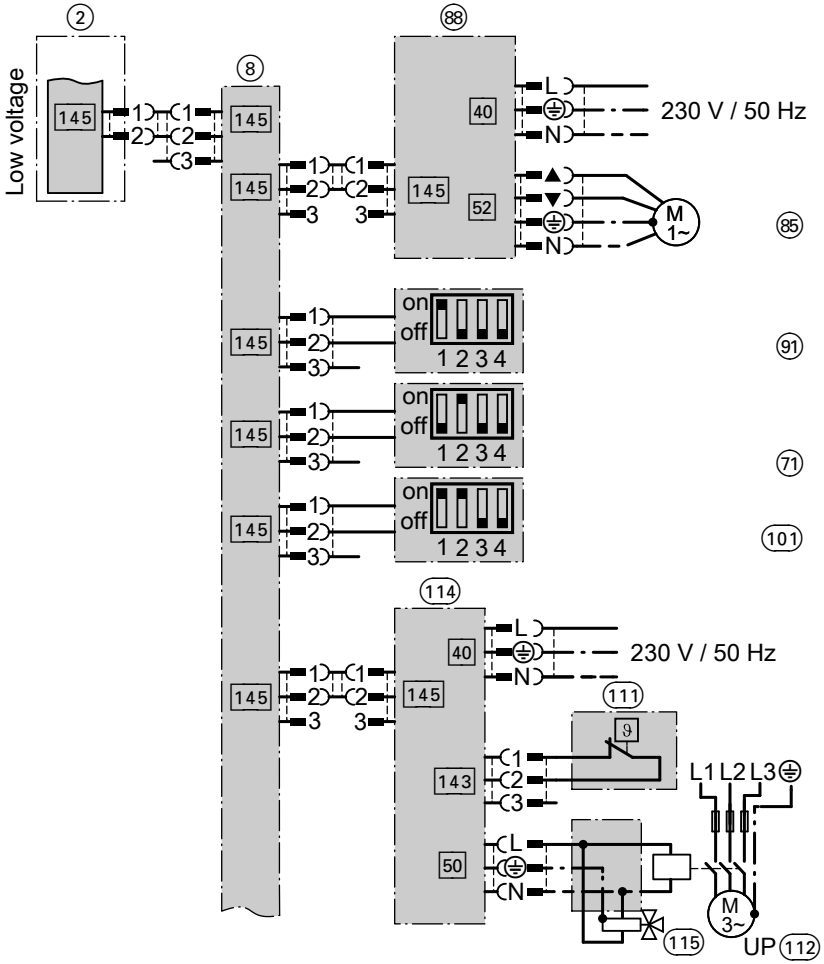
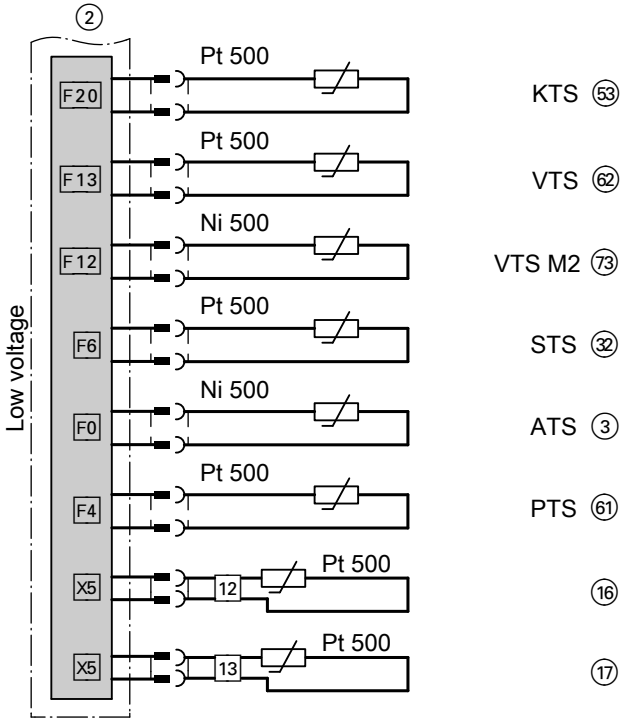
System example 2 (cont.)



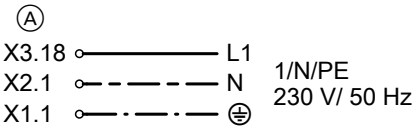
System example 2 (cont.)



System example 2 (cont.)

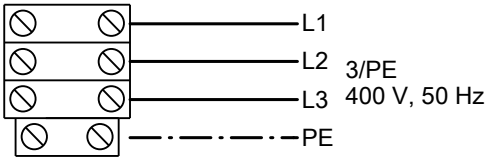


Control unit power supply



Ⓐ Mains terminals on the cross connect PCB

Compressor power supply



System example 2 (cont.)

Required parameters

Parameter	Setting
"System definition"	
■ **"System scheme 7000"**	**"10"**
■ **"Ext. extension 7010"**	**"1"**
■ **"Swimming pool 7008"**	**"1"**
"Compressor 2"	
■ **"Enable 5100"**	**"1"**
"Ext. heat source"	
■ **"External heat source 7B00"**	**"1"**
■ **"External heat source for DHW 7B0D"**	**"1"**
"Cooling"	
■ **"Cooling 7100"**	**"1"**
■ **"Cooling circuit 7101"**	**"2"**
For accessories (if installed):	
DHW circulation pump	Set switching times (see operating instructions)
"Heating circuit 1"	
■ **"Remote control 2003"**	**"1"**
"Heating circuit 2"	
■ **"Remote control 3003"**	**"1"**
"Heating circuit 3"	
■ **"Remote control 4003"**	**"1"**

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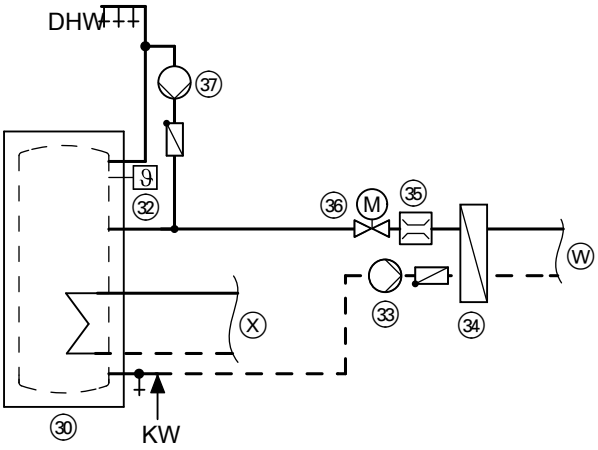
DHW heating



ⓦ	DHW interface (see system examples)	KW	Cold water
Ⓧ	Solar interface or external heat source (see system examples)	DHW	DHW

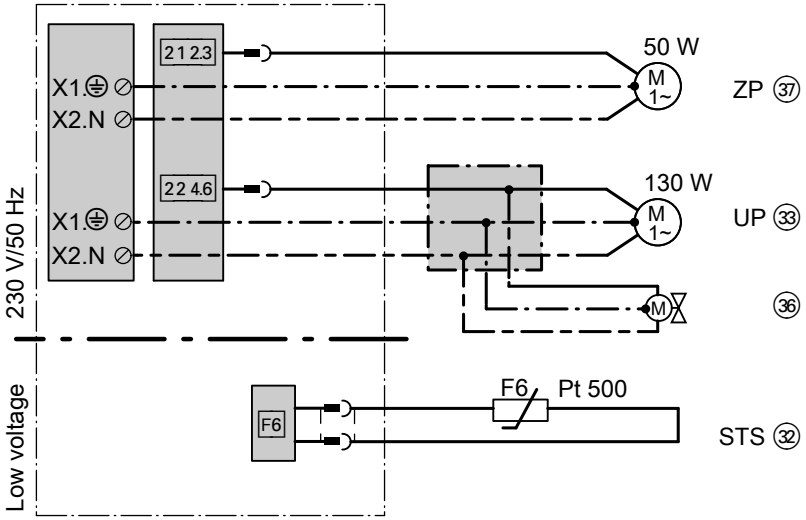
Required Equipment

Pos.	Description
㉚	DHW cylinder
㉜	Cylinder temperature sensor
㉝	Cylinder primary pump (DHW side)
㉞	Plate heat exchanger
㉟	Flow limiter
㊱	Motorised two-way valve, normally closed
㊲	DHW circulation pump

Electrical connection

For further information regarding the PCBs, see from page 220.

DHW heating (cont.)



Required parameters

Parameter	Setting
"System definition"	
■ **"System scheme"**	**"0"**, **"2"**, **"4,"** **"6"**, **"8"**, **"10"**
■ DHW circulation pump	Set switching times (see operating instructions)
"DHW"	
■ **"DHW time prog."**	Set switching times (see operating instructions)

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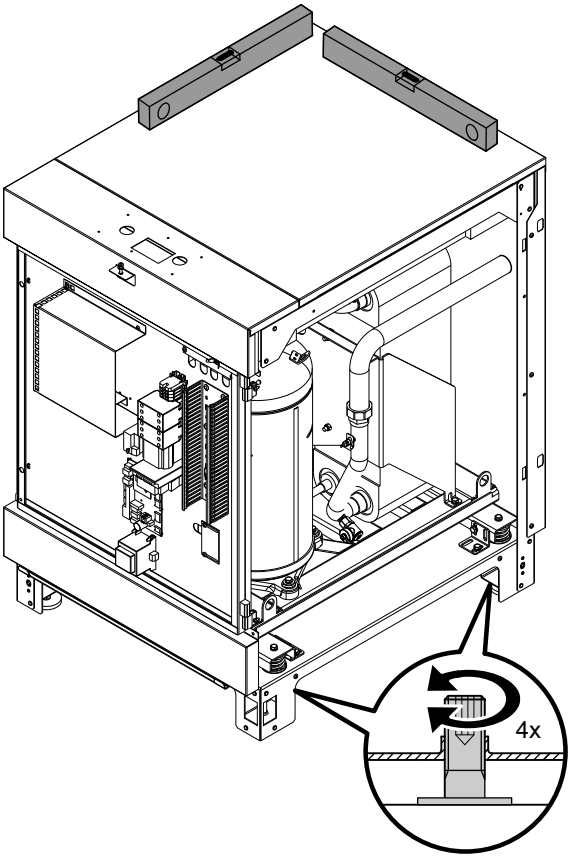
Installing the heat pump

Levelling the heat pump

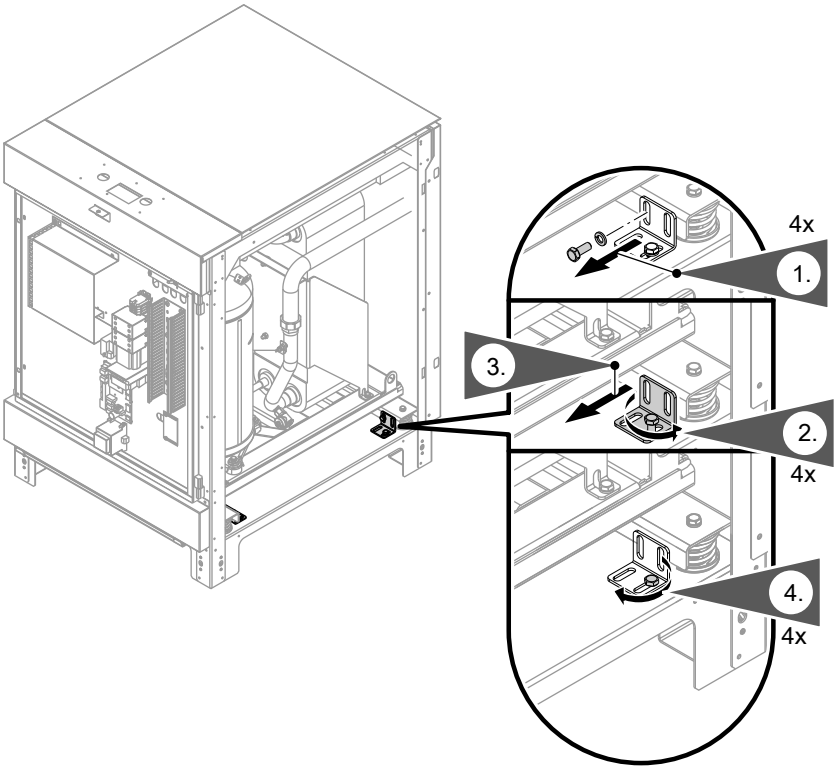


Position and level the heat pump as described on page 10.

Installing the heat pump (cont.)

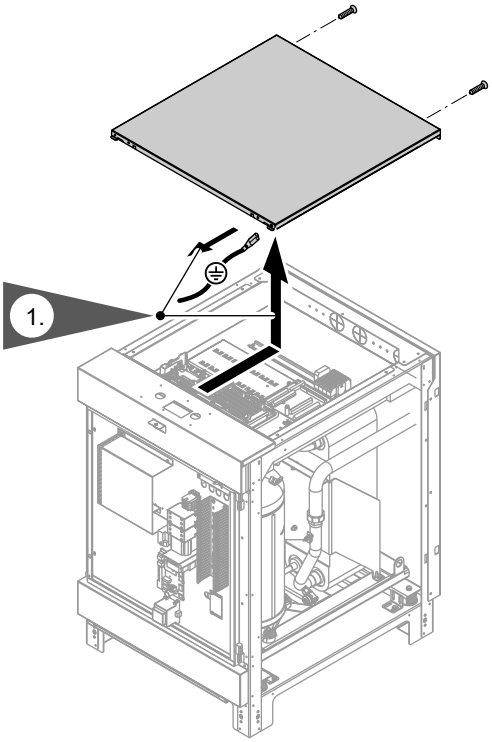
Removing the transport brackets

! **Please note**
If transport brackets are not removed, they cause vibrations and excessive development of noise.
Remove transport brackets and secure with lower screws on to the base carrier (see step 4.).



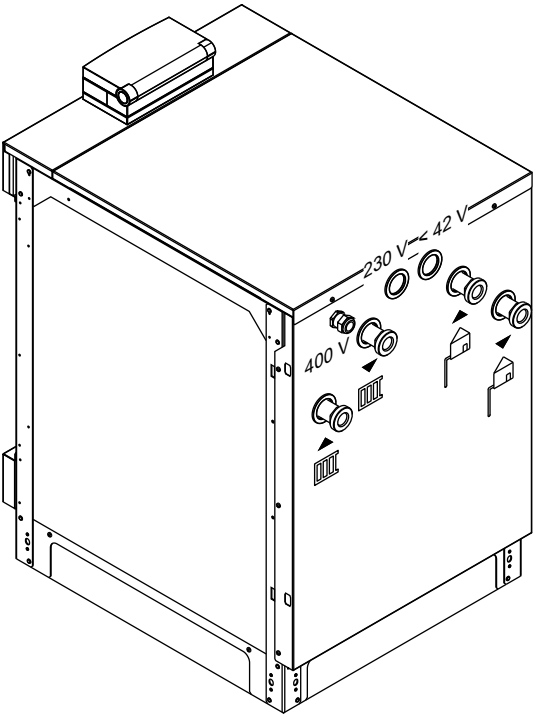
Installing the heat pump (cont.)

Remove top panel



Hydraulic connections

Overview of connections



Connecting the primary circuit

! **Please note**
The components used must be resistant to the heat transfer medium.
Never use zinc-plated/galvanised pipes.

1. Equip the primary circuit with an expansion vessel and safety valve (in accordance with DIN 4757).

Hydraulic connections (cont.)

Note

- *Expansion vessel must be approved to DIN 4807. Diaphragms of expansion vessel and safety valve must be suitable for the heat transfer medium.*
- *Blow-off and drain lines must converge in one container that can hold the maximum possible expansion volume of the heat transfer medium.*

2. Ensure adequate thermal and sound insulation of all pipes routed through walls.

3. Connect primary lines to heat pump.

   ! **Please note**

   To prevent equipment damage, connect on-site primary lines to the heat pump so that they are free of load and torque stresses.

   ! **Please note**
   Make tight hydraulic connections on the primary side.
   In the case of hose outlets, ensure grommets are seated correctly (if necessary, seal with sealing tape, see page 116).

4. Insulate lines inside the building to provide protection from heat and vapour diffusion.

5. Fill the primary circuit with Viessmann heat transfer medium and vent.

Connecting the secondary circuit

1. Equip the secondary circuit on site with an expansion vessel and safety assembly (in accordance with DIN 4757).
   Fit the safety assembly to the on-site line in the heating water return.

2. Connect secondary lines to heat pump ($\varnothing \geq 42$ mm).

Hydraulic connections (cont.)

Please note

To prevent equipment damage, connect on-site secondary lines to the heat pump so that they are free of load and torque stresses.

Please note
Make tight hydraulic connections on the secondary side. In the case of hose outlets, ensure grommets are seated correctly (if necessary, seal with sealing tape, see page 116).

3. Fill and vent secondary circuit.

4. Thermally insulate pipes inside the building.

Note
- *In underfloor heating circuits, integrate a temperature limiter on site for limiting the maximum temperature of underfloor heating systems.*
- *Safeguard minimum flow rate, e.g. with overflow valve (see Specification on page 243).*

Electrical connections

For further information, an overview of the electrical connections and more details regarding the PCBs, see page 220 onwards.
Make all external electrical connections as per the instructions from page 79 onwards.

Danger
Damaged cable insulation can cause injury and damage to the appliance.
Route cables so that they cannot touch very hot, vibrating or sharp-edged components.

Danger
Incorrectly routed wiring can lead to serious injury from electrical current and result in equipment damage.
- Route 230 V cables and LV cables separately.
- Strip the insulation from the cables as close to the terminals as possible, and bundle tightly to the associated terminals.
- Secure cables with cable ties.

This ensures that, in case of failure, for example when detaching a wire, the wires cannot drift into the adjacent voltage area.

Electrical connections (cont.)

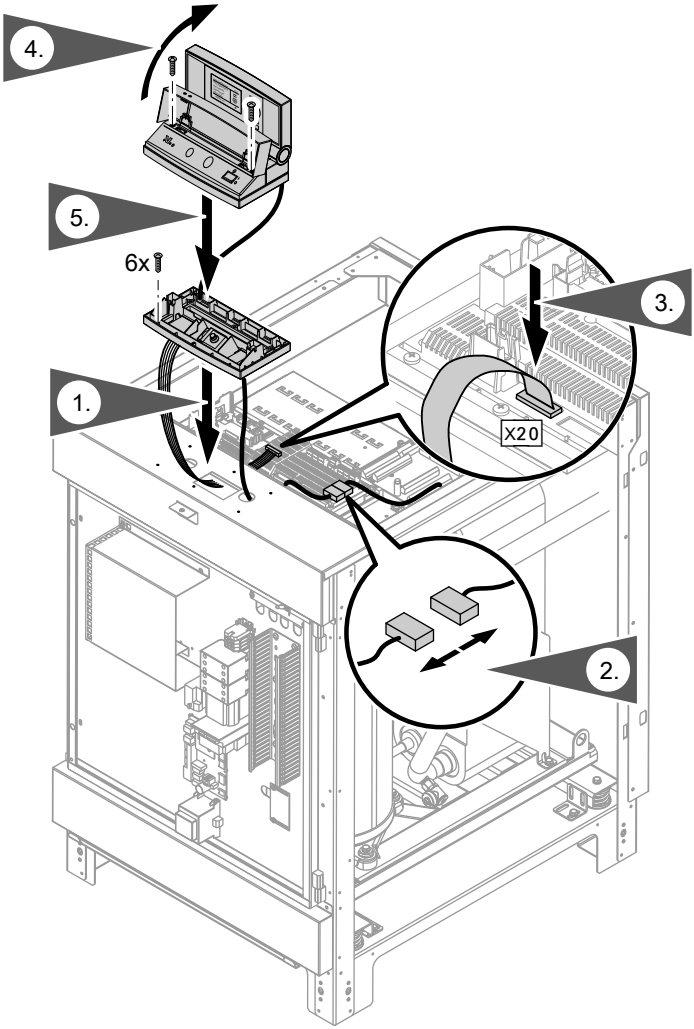
Note

- *The total output of all components connected directly to the heat pump control unit (e.g. pumps, valves, message facilities, contactors) must not exceed 1000 W.*

  If the total output ≤ 1000 W, the individual rating of a component (e.g. pump, valve, message facility, contactor) can be greater than specified. However, never exceed the breaking capacity of the corresponding relay (see page 241).
- *If two components are connected to the same terminal, press both cores together into a **single** wire ferrule.*

Electrical connections (cont.)

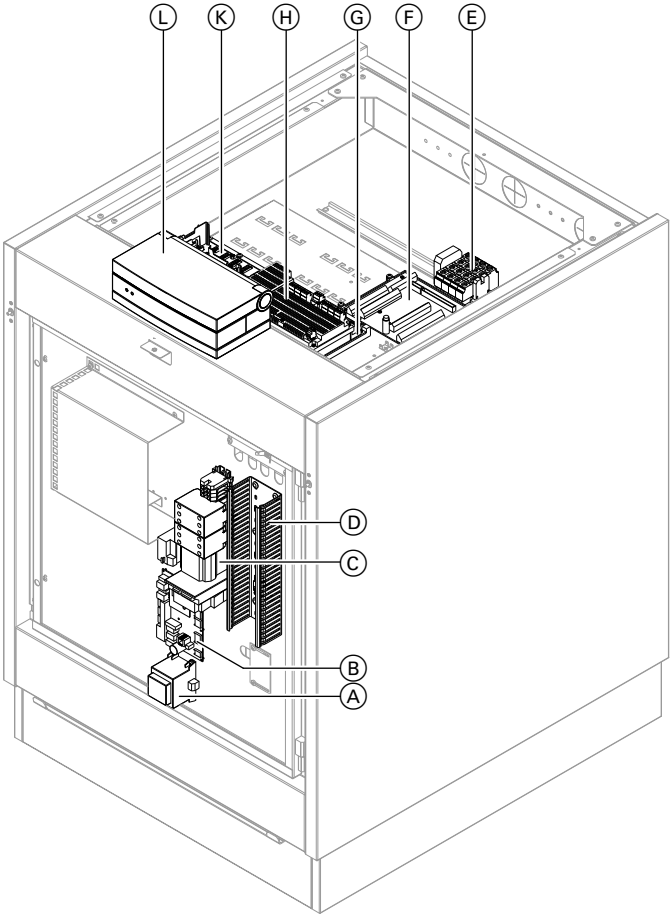
Install programming unit



Electrical connections (cont.)

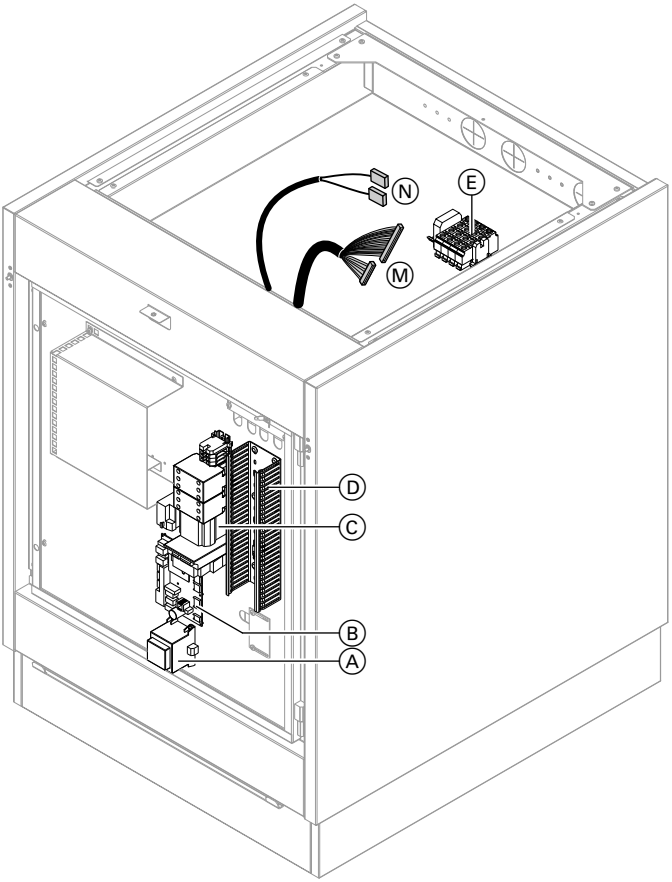
Overview of connections

Type BW



Electrical connections (cont.)

Type BWS



Ⓐ Transformer, EEV PCB
Ⓑ EEV PCB (electronic expansion valve)
Ⓒ Compressor contactors, control unit starter, three phase monitor
Ⓓ Cable trunking
Ⓔ Compressor power supply
Ⓕ Cross connect PCB
Ⓖ Main PCB
Ⓗ Main PCB extension
Ⓚ Controller and sensor PCB
Ⓛ Programming unit
Ⓜ Plug for connecting cable stage 1/2 230 V~
Ⓝ Plug for connecting cable stage 1/2, low voltage

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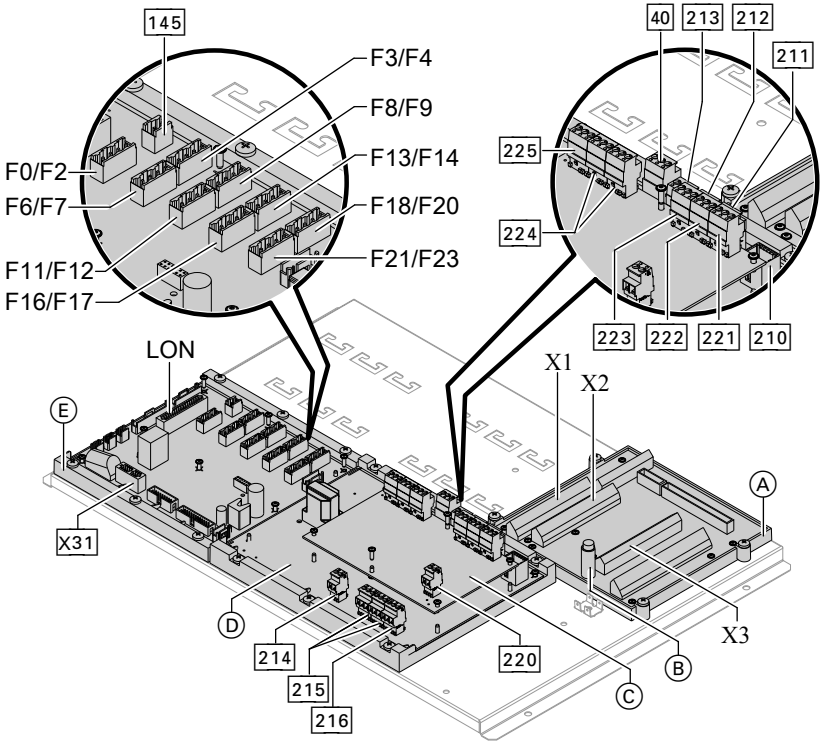
Electrical connections (cont.)

Terminal area, heat pump control unit



Ⓐ Cross connect PCB
Ⓑ Fuse F1 for heat pump control unit
Ⓒ Extension of main PCB
Ⓓ Main PCB
Ⓔ Control and sensor PCB

Terminal strips on cross connect PCB Ⓐ:
X1 Terminals for earth conductor "⏚"
X2 Terminals for neutral conductor "N"
X3 Terminals for power supply to the heat pump control unit and auxiliary components

Connections to plugs on main PCB with extension Ⓒ/Ⓓ:
- DHW circulation pump
- Heating circuit pump for heating circuit without mixer A1
- Circulation pump for cylinder heating (heating water side)
- Instantaneous heating water heater control, stage 2 (on site)
- External heat source control

Electrical connections (cont.)

- Mixer motor control, external heat source
- Central fault message
- Circulation pump of separate cooling circuit and "AC" signal for cooling
- "NC" signal for cooling
- Primary pump stages 1 and 2, well pump
- Secondary pump stages 1 and 2
- Circulation pump for DHW reheating
- Cylinder primary pump (DHW side) / two-way shut-off valve
- Heating circuit pump for heating circuit with mixer M2
- Mixer motor control, heating circuit M2
- Secondary pump
- Instantaneous heating water heater control, stage 1 (on site)

Connections on controller and sensor PCB Ⓔ:

145 KM BUS

LON Slot for LON module

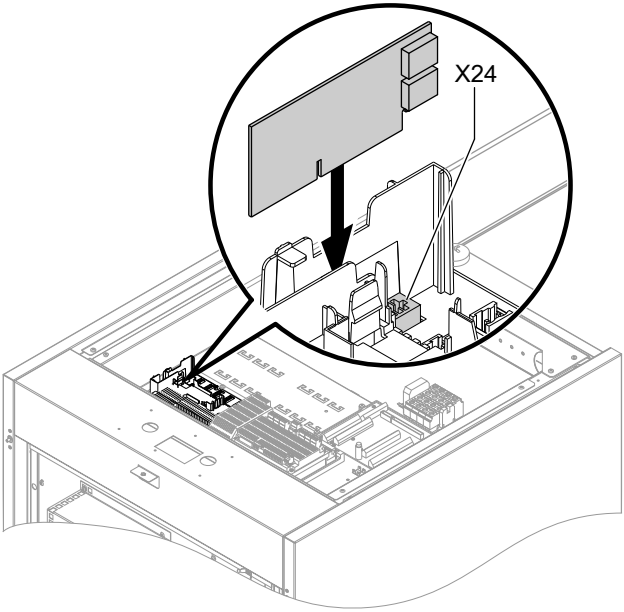
X31 Coding card slot

F.. Sensor connections:

- Outside temperature sensor
- Buffer cylinder temperature sensor above
- Boiler temperature sensor, external heat source
- Flow temperature sensor, heating circuit with mixer M2
- System flow temperature sensor
- Flow temperature sensor, secondary circuit
- Cylinder temperature sensor, top
- Remote control connection for heating circuits with/without mixer A1, M2, M3
- Temperature sensor, separate cooling circuit
- Flow temperature sensor, primary circuit
- Return temperature sensor, primary circuit
- Flow temperature sensor, secondary circuit
- Return temperature sensor, secondary circuit, stages 1 and 2
- Room temperature sensor, separate cooling circuit

Electrical connections (cont.)

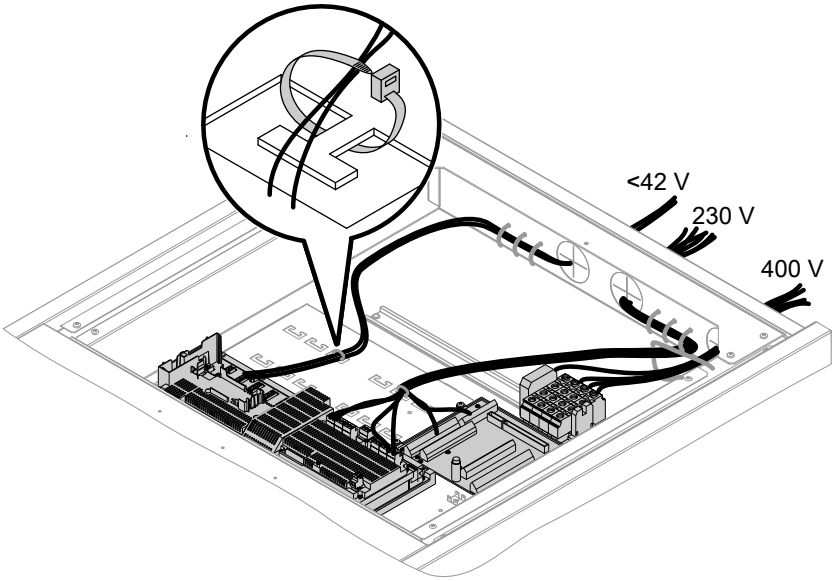
Inserting the LON communication module (accessory)



Inserting cables for the heat pump control unit terminal area

When routing the on-site power cables, observe the location of the cable entries into the appliance on its back panel (see page 13).

Electrical connections (cont.)



1. Route LV cables through opening "< 42 V" to the heat pump control unit connection area.

2. Route 230 V cables through opening "230 V" to the heat pump control unit terminal area.

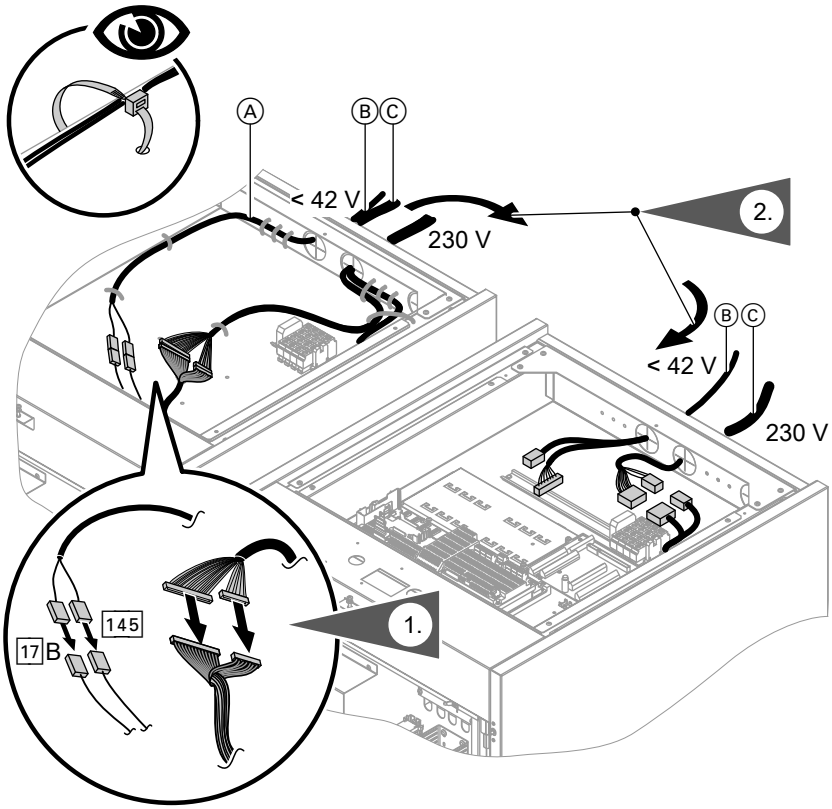
   Note
   Route LV cables and 230 V cables as far apart as possible.

3. Route power cable for compressor through opening "400 V" to terminal area. For power supply, see from page 103.

4. **Danger**
   Incorrectly routed wiring can lead to serious injury from electrical current and result in equipment damage.
   Route 230 V cables and LV leads separately, bundle tightly near the terminals and secure using the cable ties provided. This ensures that, in case of failure, for example when detaching a wire, the wires cannot drift into the adjacent voltage area.

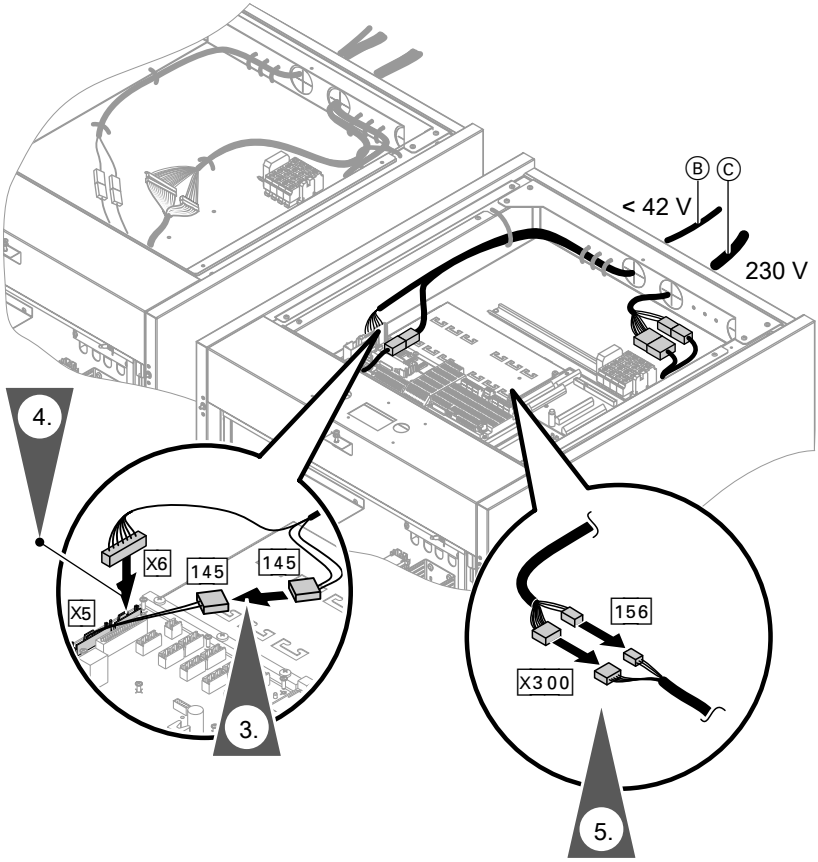
Electrical connections (cont.)

Route electrical cables from heat pump stage 2 (type BWS) to the heat pump control unit



Ⓐ Heat pump stage 2 (type BWS) terminal area for cables connecting to the heat pump (type BW)
Ⓑ 230 V~ connecting cables
Ⓒ < 42 V low voltage leads with plugs 17 and 145
Ⓓ Primary pump power cable, if installed

Electrical connections (cont.)



Ⓑ 230 V~ connecting cables with plugs "X300" and 156

Ⓒ < 42 V low voltage leads with plugs 17 and 145

Ⓓ Primary pump power cable, if installed (connection to terminals 4X41.4; see next chapter)

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Electrical connections (cont.)

Danger
Incorrectly routed wiring can lead to serious injury from electrical current and result in equipment damage.

Route 230 V cables and LV leads separately, bundle tightly near the terminals and secure using the cable ties provided. This ensures that, in case of failure, for example when detaching a wire, the wires cannot drift into the adjacent voltage area.

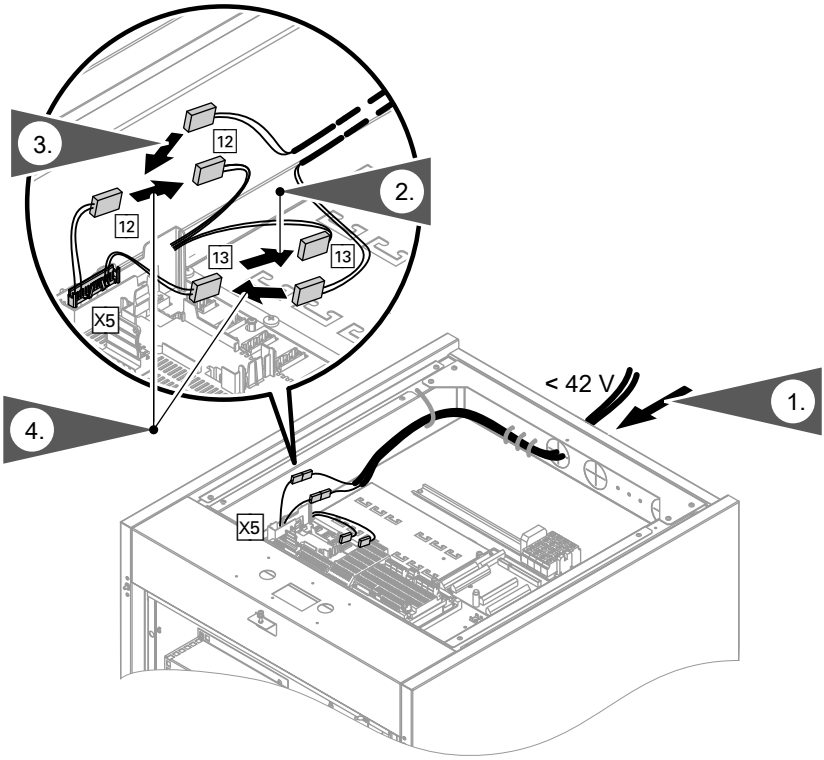
Connecting sensors

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting sensors, see system examples from page 44.
- For all sensor connections to the controller and sensor PCB, see page 228.

Sensor / KM BUS	Connection to controller and sensor PCB
KM BUS distributor	145
Buffer cylinder temperature sensor	F4
Outside temperature sensor	F0
Cylinder temperature sensor, top	F6
Flow temperature sensor, heating circuit with mixer (M2)	F12
System flow temperature sensor (with sensor well, downstream of the heating water buffer cylinder or external heat source)	F13
Flow temperature sensor, cooling circuit (direct heating circuit A1 or separate cooling circuit)	F14
Room temperature sensor, separate cooling circuit	F16
Boiler temperature sensor, external heat source	F20

Electrical connections (cont.)

Connection of primary circuit flow/return temperature sensor, two stage heat pump



12 Flow temperature sensor, primary circuit

13 Return temperature sensor, primary circuit

Please note
Identify sensor leads.
Fasten sensor leads and dismantled leads (with plug 12/13) together with the other low voltage leads using the cable ties provided.

Electrical connections (cont.)

Connecting pumps

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting pumps, see system examples from page 44.
- For connections of all pumps to main PCB with extension, see page 221. For connection of all ⏚ and N cables to cross connect PCB, see page 225.
- For parameter settings, see from page 171.

Appliance	Connection	Required parameters: Parameter ➔ setting
Circulation pump for cylinder heating (heating water side) (max. 130 W)	211.4 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ with DHW heating
Cylinder primary pump (only with primary store system, DHW side) (max. 130 W)	224.6 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ with DHW heating
Heating circuit pump for heating circuit without mixer A1 (max. 100 W)	212.2 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ with heating circuit A1
Secondary pump (max. 130 W)	211.2 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ **"1"** to **"11"**
Heating circuit pump, heating circuit with directly controlled mixer M2 (max. 100 W)	225.1 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ with heating circuit M2
Heating circuit pump, heating circuit with mixer M3 (max. 100 W)	Plug 20 in extension kit	**"System definition"** ■ **"System scheme 7000"** ➔ with heating circuit M3

Electrical connections (cont.)

Appliance	Connection	Required parameters: Parameter ➔ setting
Circulation pump, separate cooling circuit with AC cooling (max. 10 W)	212.1 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000" ➔ "0"** to **"10"** **"Cooling"** ■ **"Cooling 7100" ➔ "3"** ■ **"Cooling circuit 7101" ➔ "4"**
Solar circuit pump R1 (collector pump, DHW) See Vitosolic installation instructions	at "R1" of the Vitosolic	No parameters need to be set
DHW circulation pump (max. 50 W)	212.3 X1.⏚ X2.N	Extended menu: **"DHW circ time prog" ➔** Setting switching times
Primary pump (max. 200 W)	211.1 X1.⏚ X2.N	No parameters need to be set
Well pump control (max. 200 W) ***Note*** *Parallel connection with primary pump*	211.1 X1.⏚ X2.N	No parameters need to be set
Circulation pump for DHW reheating (max. 100 W)	224.7 X2.N	**"Ext. heat source"** ■ **"External heat source 7B00" ➔** 1 ■ **"External heat source for DHW 7B0D" ➔** 1
Solar circuit pump for heating up the heating water buffer cylinder R4	at "R4" of the Vitosolic	No parameters need to be set

Electrical connections (cont.)

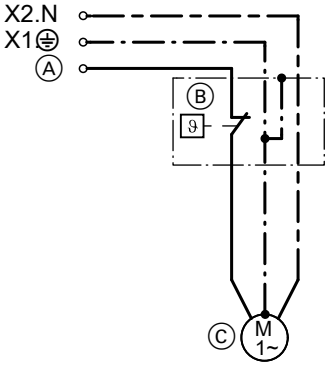
Additional pumps for two stage heat pump (type BW/BWS)

Appliance	Connection	Required parameters: Parameter ➔ setting
Circulation pump for cylinder heating, heat pump stage 2 (heating water side) (max. 130 W)	224.5 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ with DHW heating ***Note*** *Two-stage operation is enabled during commissioning by the certified heat pump contractor.*
Primary pump, heat pump stage 2 (max. 130 W)	224.2 X1.⏚ X2.N	No parameters need to be set
Secondary pump, heat pump stage 2 (max. 200 W)	224.3 X1.⏚ X2.N	**"System definition"** ■ **"System scheme 7000"** ➔ **"1"** to **"11"**

Electrical connections (cont.)

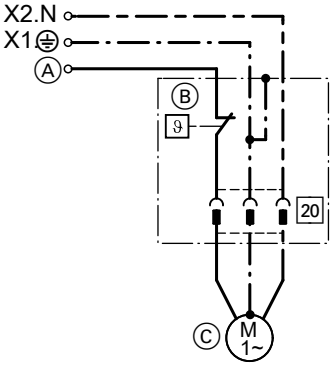
Connecting the temperature limiter for limiting the maximum temperature of underfloor heating systems

Connection with temperature limiter, general



Ⓐ For connection to main PCB with extension, see table below
Ⓑ Temperature limiter
Ⓒ Heating circuit pump A1, M2

Connection with temperature limiter (part no. 7151 728, 7151 729)

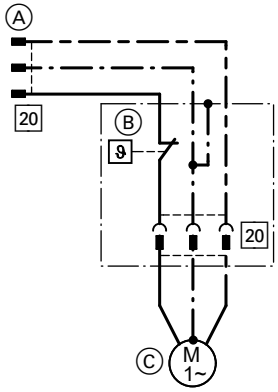


Ⓐ For connection to main PCB with extension, see table below
Ⓑ Temperature limiter
Ⓒ Heating circuit pump A1, M2

Temperature limiter for heating circuit	Connection to main PCB with extension
Heating circuit A1 without heating water buffer cylinder	211.2
Heating circuit A1 with heating water buffer cylinder	212.2
Heating circuit M2	225.1

Electrical connections (cont.)

Connection with temperature limiter (part no. 7151 728, 7151 729) to extension kit for heating circuit with mixer M3



Ⓐ Plug 20 for extension kit
Ⓑ Temperature limiter
Ⓒ Heating circuit pump M3

Connections for conversion from type BW to type WW

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting pumps and sensors, see system examples from page 44.
- For connections of all pumps to main PCB with extension, see page 221. For connection of all ⏚ and N cables to cross connect PCB, see page 225
- For all sensor connections to the controller and sensor PCB, see page 228.
- For parameter settings, see from page 171.

Electrical connections (cont.)

Appliance	Connection	Required parameters: Parameter ➔ setting
Well pump (max. 200 W) Contactors for well pump (common connection with primary pump)	211.1 X1.⏚ X2.N	No parameters need to be set
Primary circuit pressure switch and/or frost stat (in series) **or** Jumper	X3.8 X3.9	No parameters need to be set
Flow switch, well circuit	X3.3 X3.4	No parameters need to be set

Other components

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting pumps, mixers and sensors, see system examples from page 44.
- For connections of all pumps and mixers to main PCB with extension, see page 221.
  For connection of all ⏚ and N cables to cross connect PCB, see page 225
- For all sensor connections to the controller and sensor PCB, see page 228.
- For parameter settings, see from page 171.

Electrical connections (cont.)

Appliance	Connection	Required parameters: Parameter ➔ setting
Directly controlled mixer motor, heating circuit M2	225.3▲ OPEN 1X1.⏚ 1X2.N 225.2▼ CLOSE	**"System definition"** ■ **"System scheme 7000"** ➔ with heating circuit M2
Extension kit with mixer for heating circuit M3 via KM BUS.	145 ➔ 145 145 ➔ 145	**"System definition"** ■ **"System scheme 7000"** ➔ with heating circuit M3 ***Note*** *Set the DIP switch, extension kit (see extension kit installation instructions).*
Remote control (e.g. Vitotrol 200)	145 ➔ 145 145 ➔ 145	**"Heating circuit 1"** or **"Heating circuit 2"** or **"Heating circuit 3"** ■ **"Remote control 2003/3003/4003"** ➔ **"1"** ***Note*** *Set the DIP switch, remote control for heating circuit allocation (see remote control installation instructions)*
External extension H1 (KM BUS subscriber)	145 ➔ 145 145 ➔ 145	**"System definition"** ■ **"External extension 7010"** ➔ **"1"**
Vitocom 100 (KM BUS subscriber)	145 ➔ 145 145 ➔ 145	**"System definition"** ■ **"Vitocom 100 7017"** ➔ **"1"**
Vitosolic 100	1 145 ➔ 7 2 145 ➔ 8	**"Solar"** ■ **"Solar control unit type 7A00"** ➔ **"1"**

Electrical connections (cont.)

Appliance	Connection	Required parameters: Parameter ➔ setting
Vitosolic 200	145 ➔ 145 145 ➔ 145	**"Solar"** ■ **"Solar control unit type 7A00" ➔ "2"**
Motorised two-way valve and cylinder primary pump (DHW side, DHW heating with primary store system; both components to 224.6)	224.6 X2.N X1.⏚ (Pos. ㊱/㉝ side)	**"System definition"** ■ **"System scheme 7000" ➔** with DHW heating

Cooling functions

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting the cooling function, see system examples from page 44.
- For connections of cooling function to main PCB with extension, see page 221.
  For connection of all ⏚ and N cables to cross connect PCB, see page 225
- For all sensor connections to the controller and sensor PCB, see page 228.
- For parameter settings, see from page 171.

Cooling function	Connection	Required parameters: Parameter ➔ setting
Natural cooling with extension kit without mixer		
NC signal (230 V~)	211.5➔X2.4 X2.N➔X2.3 X1.⏚➔X5.⏚	**"Cooling"** ■ **"Cooling 7100" ➔ "1"** ■ **"Cooling circuit 7101" ➔ "1"** (heating circuit A1) or **"Cooling circuit 7101" ➔ "2"** (heating circuit M2) or **"Cooling circuit 7101" ➔ "3"** (heating circuit M3) or **"Cooling circuit 7101" ➔ "4"** (separate cooling circuit)

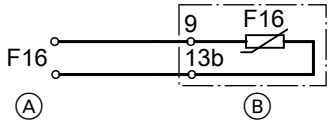
Electrical connections (cont.)

Cooling function	Connection	Required parameters: Parameter ➔ setting
Natural cooling with extension kit with mixer		
NC signal (230 V~)	211.5➔X2.4 X2.N➔X2.3 X1.⏚➔X5.⏚	**"Cooling"** ■ **"Cooling 7100" ➔ "2"** ■ **"Cooling circuit 7101" ➔ "1"** (heating circuit A1) or **"Cooling circuit 7101" ➔ "2"** (heating circuit M2) or **"Cooling circuit 7101" ➔ "3"** (heating circuit M3) or **"Cooling circuit 7101" ➔ "4"** (separate cooling circuit)
Mixer (via KM BUS)	145 ➔ 145 145 ➔ 145	
Active cooling (both signals required)		
AC signal (230 V~)	212.1 X2.N X1.⏚	**"Cooling"** ■ **"Cooling 7100" ➔ "3"** ■ **"Cooling circuit 7101" ➔ "1"** (heating circuit A1) or **"Cooling circuit 7101" ➔ "2"** (heating circuit M2) or **"Cooling circuit 7101" ➔ "3"** (heating circuit M3) or **"Cooling circuit 7101" ➔ "4"** (separate cooling circuit)
NC signal (230 V~)	211.5 X2.N X1.⏚	

Electrical connections (cont.)

Room temperature sensor for separate cooling circuit (part no. 7408 012)

Note
No parameters need to be set.

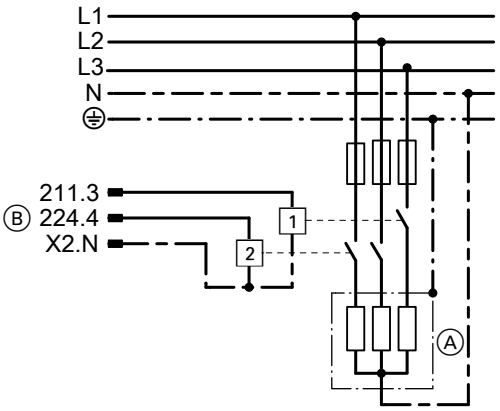


Ⓐ Connection to controller and sensor PCB
Ⓑ Room temperature sensor (Ni 500)

Instantaneous heating water heater (on site)

Connection
Installation instructions
Instantaneous heating water heater (on site).

Instantaneous heating water heater control and load circuit



Ⓐ Instantaneous heating water heater
Ⓑ Connection to main PCB with extension and to cross connect PCB
211.3 Stage 1
224.4 Stage 2

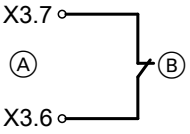
Electrical connections (cont.)

Required parameters:

Parameter ➔ setting
"Electric heater"
■ **"Inst. heating water heater 7900" ➔ "1"**
■ If necessary **"Heating with electro 7902" ➔ "1"**

Power-OFF

The supply voltage to the relevant components (subject to power supply utility) is switched off by the power-OFF contact signal.



Ⓐ Terminals on cross connect PCB
Ⓑ Zero volt N/C contact
Breaking capacity 230 V~, 0.15 A; remove jumper when making this connection

Contact open:	Power-OFF enabled
Contact closed:	Power-OFF disabled

Note

- *No parameters need to be set.*
- *The compressor is forced OFF as soon as the contact opens.*
- *For the instantaneous heating water heater, the stages to be switched off can be selected. See parameter* ***"Stage at power-OFF 790A"*** *on page 197.*

For further information, see from page 103.

External heat source

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting pumps and mixers, see system examples from page 44.
- For connections of all pumps and mixers to main PCB with extension, see page 221.
  For connection of all ⏚ and N cables to cross connect PCB, see page 225
- For all sensor connections to the controller and sensor PCB, see page 228.
- For parameter settings, see from page 171.

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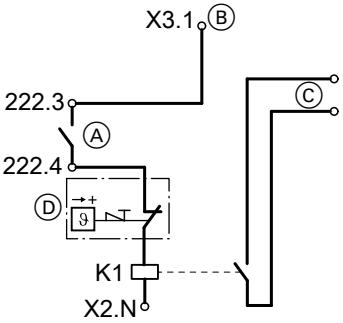
Electrical connections (cont.)

Please note
Protect the heat pump against temperatures over 70 °C from the external heat source.
Install high limit safety cut-out (STB) or, if required, also take additional measures (e.g. second STB to switch off the secondary pump).

Note

- *The switching contact to demand heat from an external heat source in the heat pump is a zero volt N/O contact that closes in case of heat demand.*
- *This contact can be subjected to a load of 230 V~/4(2) A in case of an external voltage supply. Never route low voltage via this contact; that requires an on-site relay.*
- *The boiler water temperature sensor in the external heat source (plug F20) must capture the average temperature of the external heat source.*



Ⓐ Terminals on main PCB with extension: Contact load 230 V~, 4(2) A, zero volt contact
Ⓑ Install jumper from X3.1 (cross connect PCB) to 222.3 (main PCB with extension)
Ⓒ Connection at the external heat source on the terminals for external demand
Ⓓ High limit safety cut-out (this is set to 70 °C) as heat pump protection
K1 Relay; sizing in accordance with the external heat source; observe safety instructions

Appliance	Connection	Required parameters: Parameter ➔ setting
Mixer motor, external heat source	222.2▲ OPEN X1.⏚ X2.N 222.1▼ CLOSE	**"Ext. heat source"** ■ **"External heat source 7B00" ➔ "1"**
Control of an external heat source	222.3 222.4	**"Ext. heat source"** ■ **"External heat source 7B00" ➔ "1"**
Circulation pump for DHW reheating	224.7 X1.⏚ X2.N	**"Ext. heat source"** ■ **"External heat source 7B00" ➔ "1"**

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Electrical connections (cont.)

External hook-up

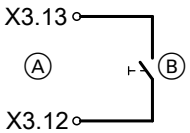
The external components can also be hooked up via "External extension H1".

Installation instructions "External extension H1"

Note
*If the components for swimming pool heating are connected to "External extension H1", **no** further hook-up (e.g. operating status changeover) can be connected.*

- For PCB locations (terminal and plug markings), see from page 75.
- For examples of connecting pumps, mixers and sensors, see system examples from page 44.
- For connections of all pumps and mixers to main PCB with extension, see page 221.
  For connection of all ⏚ and N cables to cross connect PCB, see page 225
- For all sensor connections to the controller and sensor PCB, see page 228.
- For parameter settings, see from page 171.

External demand, external mixer "OPEN", operating status changeover



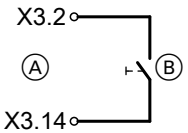
Ⓐ Terminals on cross connect PCB
Ⓑ Zero volt N/O contact outside the heat pump control unit (on site)
Breaking capacity 230 V~; 2 mA

Electrical connections (cont.)

Required parameters

Function	Parameter ➔ setting
External demand	No parameters need to be set; the set flow temperature for external demand can be specified (parameter **"Set flow temperature, external demand 730C"**, see page 202).
External mixer "OPEN"	**"System definition"** ■ **"External demand mixer "OPEN" 7014" ➔ "0"** to **"7"** (see page 182). Observe parameter **"Set flow temperature, external demand 730C"** (see page 202).
External changeover of the operating status	**"System definition"** ■ **"Changing the heating circuit operating mode 7011" ➔ "0"** to **"10"** (see page 177) ■ **"Effect of operating mode changeover 7012" ➔ "0"** to **"3"** (see page 179) ■ **"Duration of operating mode changeover 7013" ➔ "0"** to **"12"** (see page 181)

External blocking, external mixer "CLOSED"



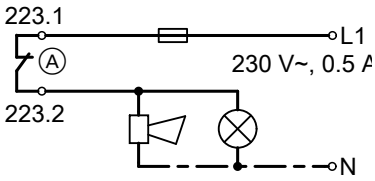
Ⓐ Terminals on cross connect PCB
Ⓑ Zero volt N/O contact
Breaking capacity 230 V~; 2 mA

Electrical connections (cont.)

Required parameters

Function	Parameter ➔ setting
External blocking	**"System definition"** ■ **"External blocking effect 701A" ➔ "0"** to **"31"**.
External mixer "CLOSED"	**"System definition"** ■ **"External blocking mixer "CLOSED" 7015" ➔ "0"** to **"8"** (see page 183) Observe parameter **"External blocking effect 701A"**.

Central fault message



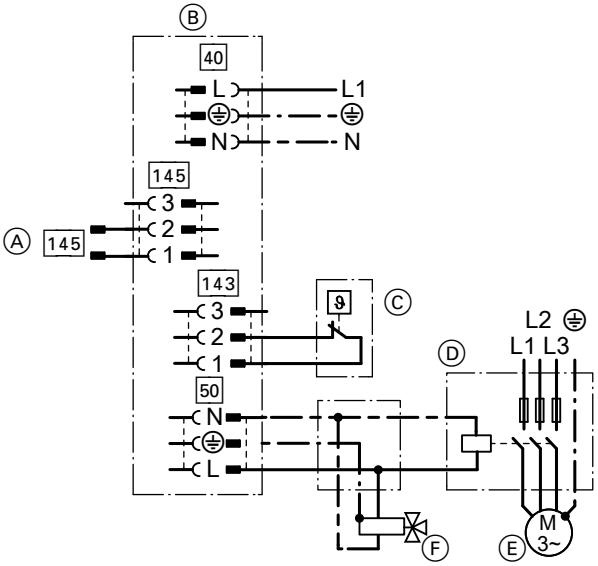
Ⓐ Terminals on main PCB with extension
Zero volt contact in the heat pump, open in fault-free operation (voltage > 42 V)
Breaking capacity 230 V~; 4(2) A

Note
- *No parameters need to be set.*
- *The contact issues a short pulse when the power supply is switched on. Observe the pulse when processing the message via communication tools.*

Swimming pool water heating

Note
- *Swimming pool heating is controlled with KM BUS via "External extension H1".*
- *Make connections to "External extension H1" **only** according to the following diagram.*
- *Connect **only** the circulation pump for swimming pool heating Ⓔ to plug 50 according to the following diagram. A filter circuit pump must be connected separately.*
- *If the components for swimming pool heating are connected to "External extension H1", **no** further hook-up (e.g. operating status changeover) can be connected.*

Electrical connections (cont.)



Ⓐ Connection on controller and sensor PCB
Ⓑ External extension H1
Ⓒ Thermostat for swimming pool temperature control (zero volt contact, 230 V~; 0.1 A; accessory)
Ⓓ Junction box (on site)
Ⓔ Fuses and contactor for circulation pump for swimming pool heating (accessory)
Ⓕ Circulation pump for swimming pool water heating (accessory)
Ⓖ Three-way diverter valve "swimming pool" (zero volt: Heating the heating water buffer cylinder)

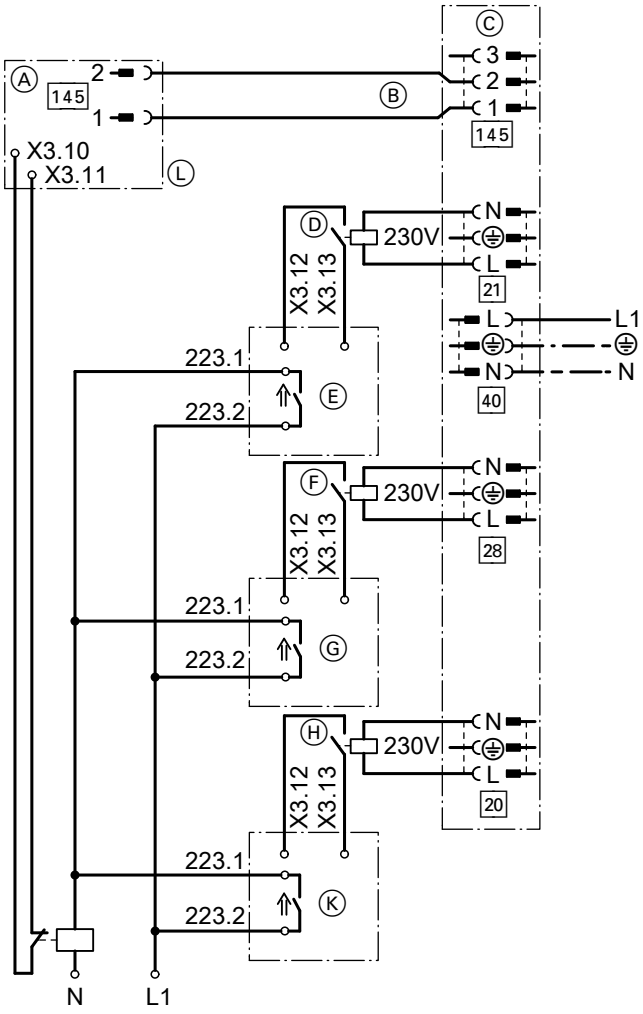
Required parameters

Parameter ➔ setting
"System definition"
■ **"External extension 7010" ➔ "1"**
■ **"Swimming pool 7008" ➔ "1"**

Cascade control via KM BUS

Make connections to "External extension H1" **only** according to the following diagram.

Electrical connections (cont.)



Ⓐ Heat pump 1 (lead appliance)
Ⓑ KM BUS
Ⓒ External extension H1
Ⓓ Zero volt contact "External demand"
Ⓔ Lag heat pump 1
Connection at the contact for "External demand"
Ⓕ Zero volt contact "External demand"

Electrical connections (cont.)

Ⓖ Lag heat pump 2
Connection at the contact for "External demand"
Ⓗ Zero volt contact "External demand"
Ⓚ Lag heat pump 3
Ⓛ Central fault message input, lag heat pump
Open contact X3.10 / X3.11 triggers a message (see central fault message, page 99).

Required parameters

Appliance	**Parameter ➔ setting**
Lead appliance	**"System definition"** ■ **"System scheme 7000" ➔ "0"** to **"10"** ■ **"External extension 7010" ➔ "1"** ■ **"Cascade control 700A" ➔ "1"** ■ **"Output lag heat pump 700B" ➔ "0"** to **"255"** ■ **"No. of external heat pumps 5735" ➔ "1"** to **"3"**
Lag heat pump ***Note*** *Set the parameters for all lag heat pumps.*	**"System definition"** ■ **"System scheme 7000" ➔ "11"** ■ **"Cascade control 700A" ➔** 0 ■ **"Set flow temperature, external demand 730C" ➔ "0"** to **"70"** (see page 202)

Power supply

Danger
Incorrectly executed electrical installations can lead to injury from electrical current and result in equipment damage.

Make the power supply connection and implement all earthing measures (e.g. RCD circuit) in accordance with the following regulations:
- IEC 60364-4-41
- VDE requirements
- Requirements specified by your local power supply utility
- Protect the power cable to the control unit with no more than 16 A.

Danger
The absence of component earthing in the system can lead to serious injury from electrical current if an electrical fault occurs. The equipment and the pipework must be connected to the earth bonding of the house in question.

Isolators for non-earthed conductors
- The main isolator (if installed) must simultaneously isolate all non-earthed conductors from the mains with a minimum contact separation of 3 mm.
- If **no** main isolator is installed, all non-earthed cables must be isolated from the mains by the upstream breaker with at least 3 mm contact separation.

Danger
Incorrect core termination can cause severe injuries and damage to the equipment.
Never interchange cores "L" and "N".

Power supply (cont.)

General information regarding the power supply

Information regarding the compressor power supply

- **Please note**
  An incorrect phase sequence can cause damage to the unit. Make the compressor power supply **only** in the phase sequence specified (see terminal) with a **clockwise** rotating field.

- If compressor and/or instantaneous heating water heater (on site) are operated at a lower tariff (power-OFF), provide an additional cable (e.g. NYM 3 x 1.5 mm^2) for the power-OFF signal from the distribution board (meter box) to the control unit.

Information regarding the heat pump control unit power supply

- Protect the power supply to the heat pump control unit with 16 A max.
- For accessories and external components which are not to be connected to the control unit, we recommend making the power connection to the same fuse, but with at least the same phase as the control unit.
  Connection to the same fuse/MCB provides additional safety when the power is switched off. Observe the power consumption of the consumers connected (see page 241).
- The power supply to the heat pump control unit (3 x 1.5 mm^2) and the cable for the power-OFF signal can be combined in a five-core cable. Observe the technical connection requirements of the power supply utility.

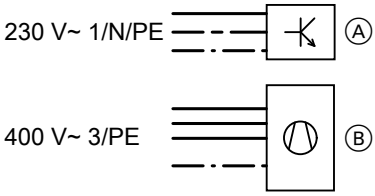
Information regarding the power supply utility

- In negotiations with your power supply utility, different supply tariffs for the main power circuits may be offered.
- The **control unit/electronics** feed must be implemented **without** possible blocking from the power supply utility; tariffs that are subject to possible shutdowns must not be applied to these feeds.
- The allocation of the power-OFF (for compressor and/or instantaneous heating water heater) is made via the type of connection and by a setting in the control unit (see pages 108 and 197). In Germany, the power supply can be cut off for up to 3 x 2 hours within any 24 h period.

Power supply (cont.)

Connecting power cables

The power supply is separated into two areas with two power cables:



Ⓐ Power supply to heat pump control unit
Ⓑ Power supply to compressor stages 1 and 2

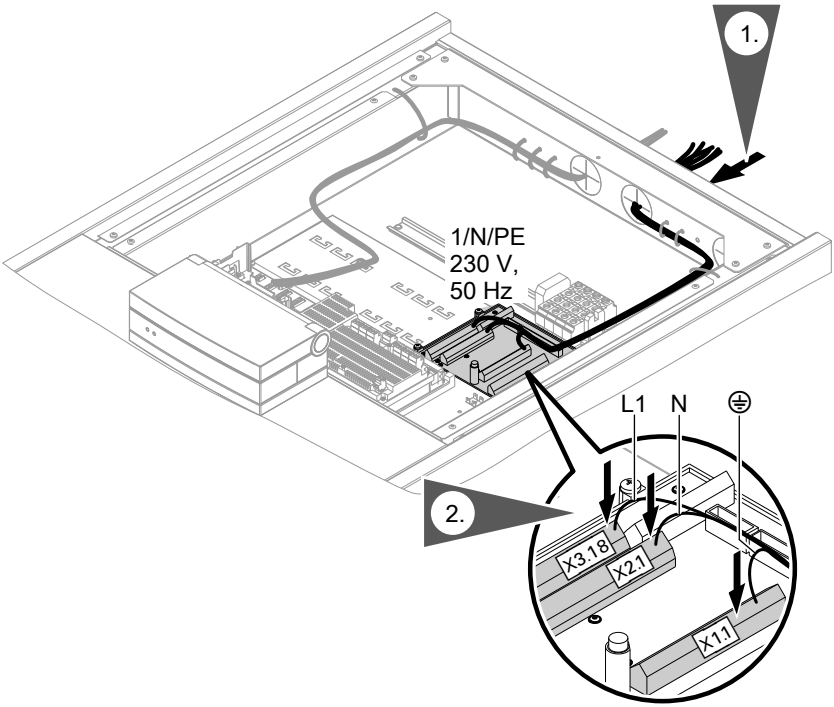
Recommended power cables:

Type	Heat pump control unit (230 V~)	Compressor (400 V~)	
			Max. cable length
BW 121	3 x 1.5 mm²	4 x 2.5 mm²	50 m
BWS 121	—	4 x 2.5 mm²	50 m
BW 129	3 x 1.5 mm²	4 x 4.0 mm²	50 m
BWS 129	—	4 x 4.0 mm²	50 m
BW 145	3 x 1.5 mm²	4 x 6.0 mm²	40 m
BWS 145	—	4 x 6.0 mm²	40 m

Danger
Damaged cable insulation can cause injury and damage to the appliance.
Route cables so that they cannot touch very hot, vibrating or sharp-edged components.

Power supply (cont.)

Connect heat pump control unit power cable (230 V~)



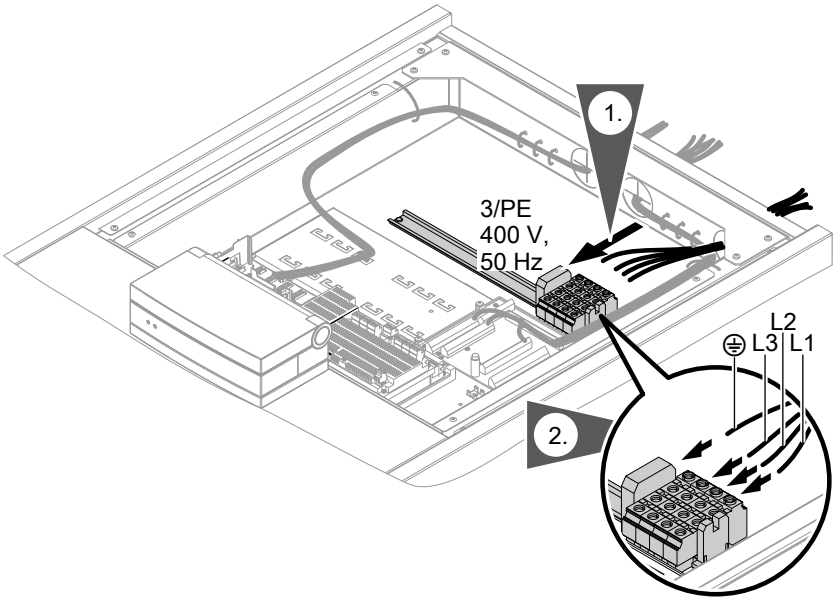
Note
*This supply must **never** be blocked.*

- Max. fuse rating 16 A
- Standard tariff (no optional low tariff with power-OFF)

Power supply (cont.)

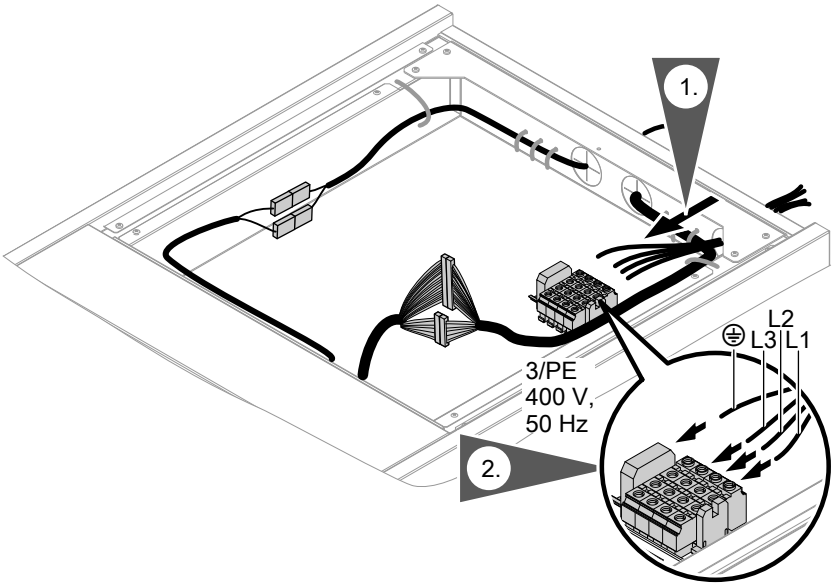
Connect compressor power cable (400 V~)

Single stage (type BW)



Power supply (cont.)

Two stage (type BW/BWS)



- Fuse protection in accordance with the compressor rating (see specification).
- Low tariff and power-OFF can be used.
- No parameters need to be set when using low tariff with power-OFF. During the power-OFF period, the compressor is shut down.

Power supply with power-OFF

Power-OFF without on-site load disconnection

The power-OFF signal is connected directly to the heat pump control unit. When power-OFF is enabled, **both** compressors (type BW/BWS) are forced OFF.

Parameter **"Stage at power-OFF"** is used to determine whether and at what stage the instantaneous heating water heater (on site) remains operational during the power-OFF (see page 197).

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Power supply (cont.)

Note
Observe the technical connection conditions of the relevant power supply utility.

Single stage (type BW)

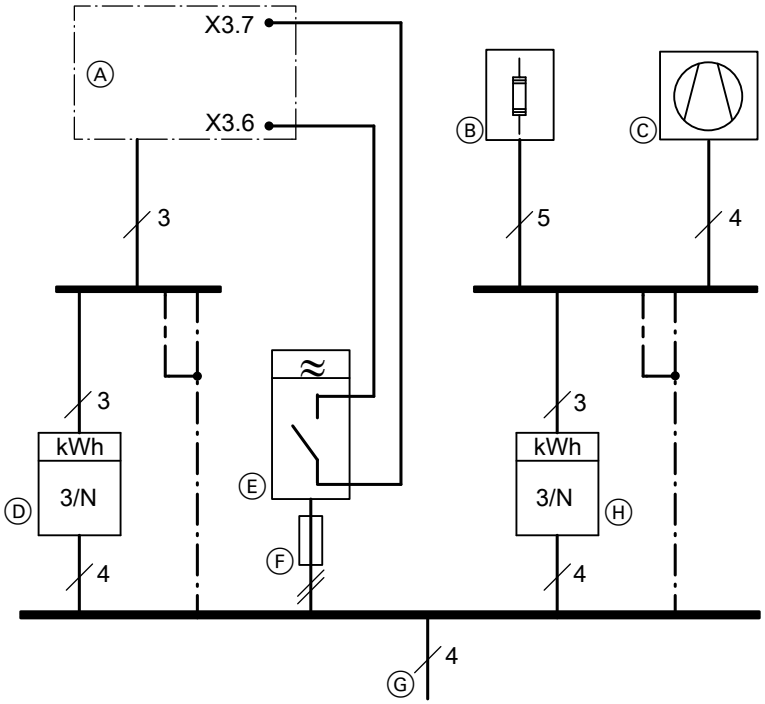
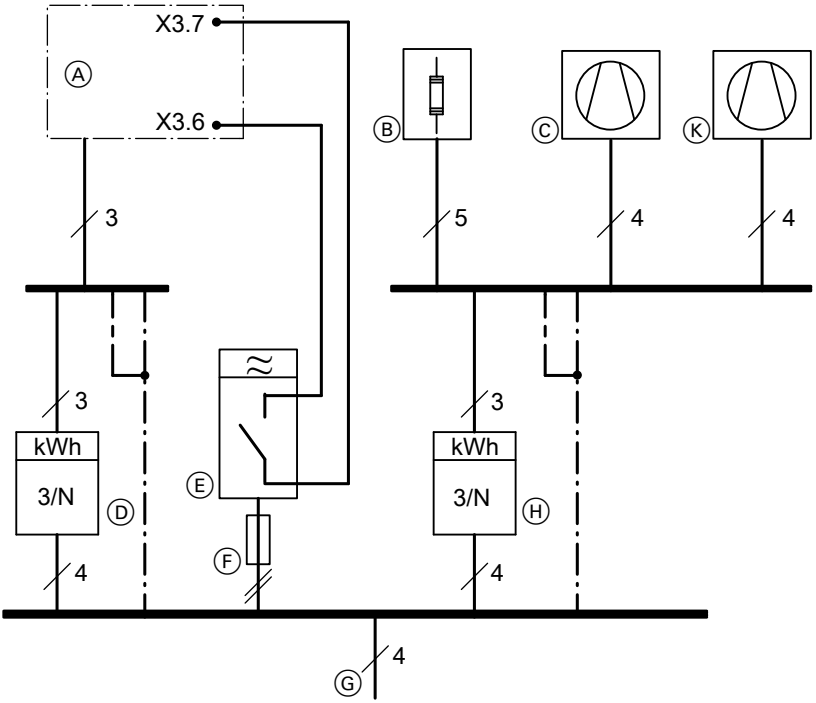


Diagram excluding fuses and RCD.

Ⓐ Heat pump control unit (for connection on cross connect PCB, see page 225)
Ⓑ Instantaneous heating water heater (on site)
Ⓒ Heat pump compressor (type BW)
Ⓓ High tariff meter
Ⓔ Ripple control receiver (contact open: power-OFF enabled)
Ⓕ Backup fuse ripple control receiver
Ⓖ TNC system feed
Ⓗ Low tariff meter

Power supply (cont.)

Two stage (type BW/BWS)



Shown excluding fuses and RCD.

- Ⓐ Heat pump control unit (for connection on cross connect PCB, see page 225)
- Ⓑ Instantaneous heating water heater (on site)
- Ⓒ Heat pump compressor stage 1 (type BW)
- Ⓓ High tariff meter
- Ⓔ Ripple control receiver (contact open: power-OFF enabled)
- Ⓕ Backup fuse ripple control receiver
- Ⓖ TNC system feed
- Ⓗ Low tariff meter
- Ⓚ Heat pump compressor stage 2 (type BWS)

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Power supply (cont.)

Power-OFF with on-site load disconnection

The power-OFF signal is connected to the on-site contactor of the low tariff power supply and in the heat pump control unit (heat pump type BW). When power-OFF is enabled, **both** compressors (type BW+BWS) **and** the instantaneous heating water heater (on site) are forced OFF.

Note
Observe the technical connection conditions of the relevant power supply utility.

Single stage (type BW)

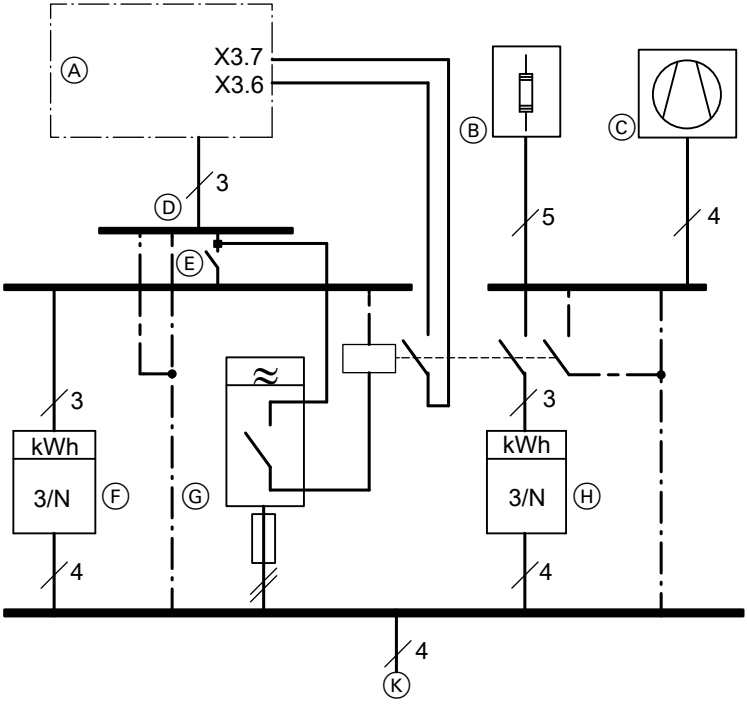


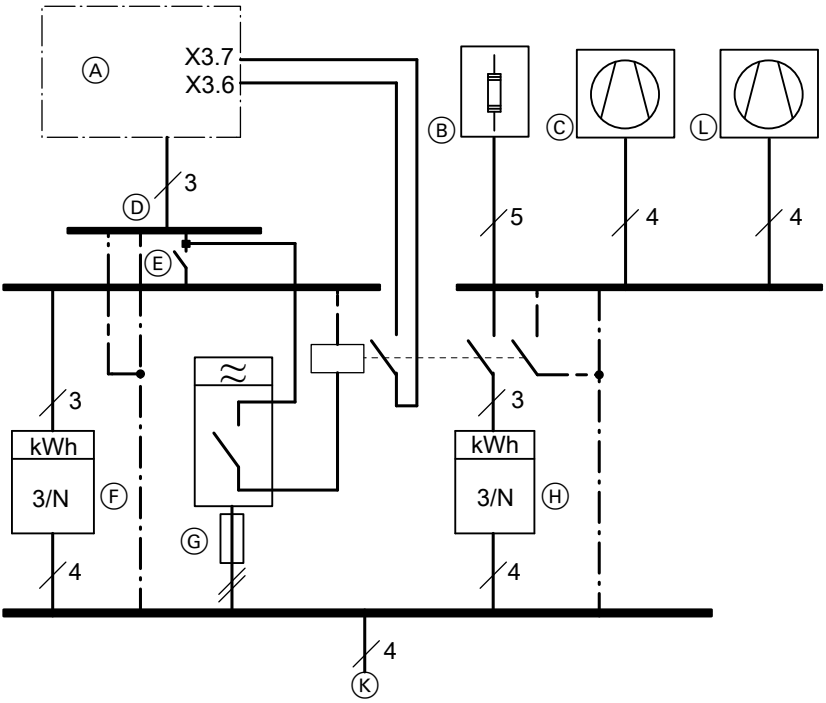
Diagram excluding fuses and RCD.

Ⓐ Heat pump control unit (for connection on cross connect PCB, see page 225)
Ⓑ Instantaneous heating water heater (on site)
Ⓒ Heat pump compressor (type BW)

Power supply (cont.)

Ⓓ Control unit power supply
Ⓔ Main isolator
Ⓕ High tariff meter
Ⓖ Ripple control receiver (contact open: power-OFF enabled) with backup fuse
Ⓗ Low tariff meter
Ⓚ TNC system feed

Two stage (type BW/BWS)



Shown excluding fuses and RCD.

Ⓐ Heat pump control unit (for connection on cross connect PCB, see page 225)
Ⓑ Instantaneous heating water heater (on site)
Ⓒ Heat pump compressor stage 1 (type BW)
Ⓓ Control unit power supply
Ⓔ Main isolator
Ⓕ High tariff meter
Ⓖ Ripple control receiver (contact open: power-OFF enabled) with backup fuse
Ⓗ Low tariff meter

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Power supply (cont.)

Ⓚ TNC system feed
Ⓛ Heat pump compressor stage 2 (type BWS)

Phase monitor

The phase monitor is factory-fitted in the type BW and is available as an accessory for type BWS.
The phase monitor is used to monitor the mains power supply to the compressor.

The following power supply deviations are permitted in the delivered condition:

Over/undervoltage	15%
Phase asymmetry	15%
Switching delay	4 s

The phase monitor switches off (switching contact opens) if these tolerances are exceeded.
The phase monitor automatically re-enables the power supply if the values return to within the specified tolerance range. Remove the cause if the relay has responded. The relay does not need to be reset.

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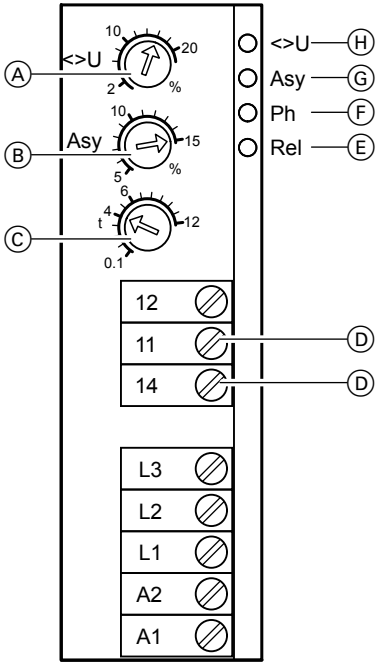
Power supply (cont.)



Ⓐ Over/undervoltage in %
Ⓑ Phase asymmetry in %
Ⓒ Switching delay in s
Ⓓ Contact used in safety chain (N/O)
Ⓔ Operating display ("Rel")
Ⓕ Fault display phase failure/phase sequence ("Ph")
Ⓖ Fault display asymmetry ("Asy")
Ⓗ Fault display over/undervoltage ("<>U")

LEDs explained

- LED "Rel" illuminates green:
  All voltages and the rotating field (clockwise) are healthy.
- LED "Ph" illuminates red:
  The relay has responded; the rotating field is anticlockwise.
- All LED's off:
  One or several phases have dropped out.
- LED "<>U" illuminates red:
  Incorrect voltage on one/several phase(s).
- LED "Asy" illuminates red:
  Asymmetry on one/several phase(s).

Connecting to terminals X3.8/X3.9

After connecting the power supply, one of the following components **must** be connected at terminals X3.8 and X3.9:

- Primary circuit pressure switch and/or frost stat
  or
- Jumper from the pack

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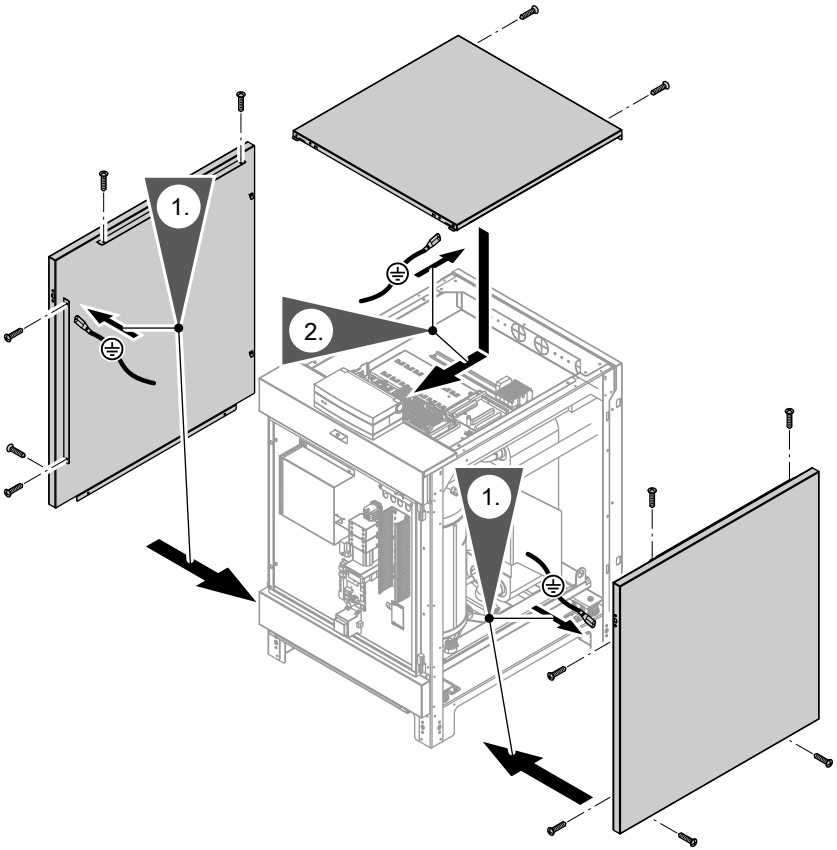
Closing the heat pump

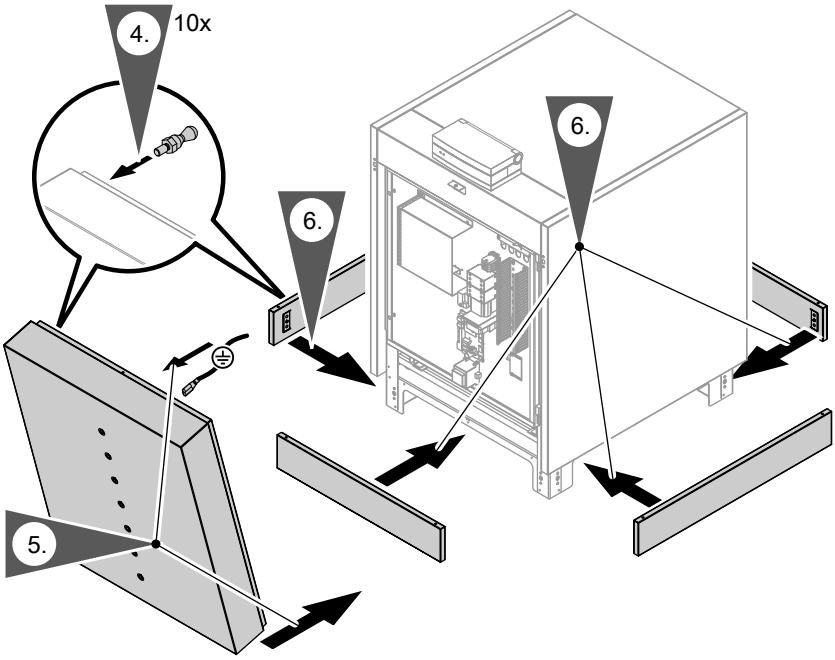
Please note
Seal the appliance to be sound-proof and diffusion-proof.
Check tightness of internal hydraulic connections.

Please note
To prevent the formation of condensate and extreme noise development, tightly seal the control unit door.

Danger
The absence of component earthing in the system can lead to serious injury from electrical current if an electrical fault occurs.
Attach earth conductor to front panel and side panel.



Closing the heat pump (cont.)



Checking grommets

! **Please note**
Seal the appliance to be sound-proof and diffusion-proof.
With hose outlets, ensure grommets Ⓐ are seated correctly.
Seal grommets Ⓐ with adhesive tape.

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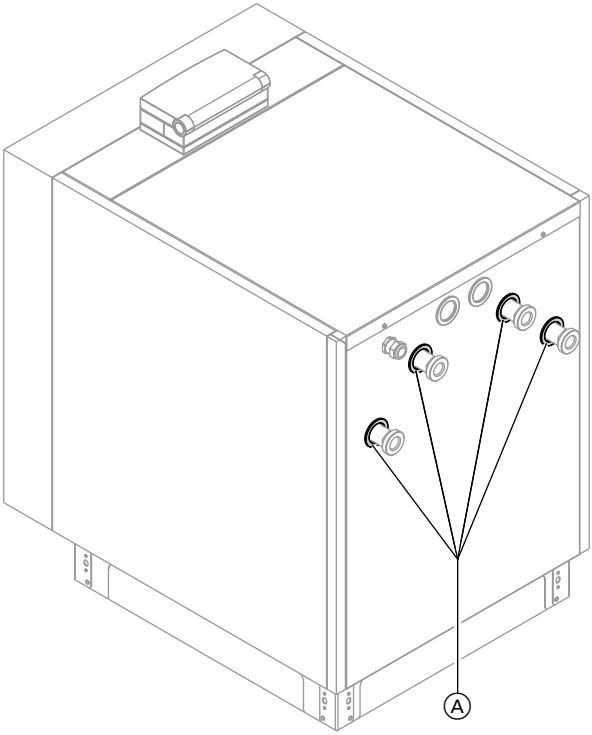
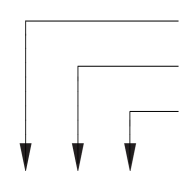
Checking grommets (cont.)



Steps - commissioning, inspection and maintenance

For further information regarding the individual steps, see the page indicated



Commissioning steps

Inspection steps

Maintenance steps

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Further details regarding the individual steps

Opening the heat pump

Danger
Contact with 'live' components can lead to severe injury from electric current.
Never touch terminal areas (heat pump control unit and power connections; see page 75).

Danger
The absence of component earthing can lead to serious injury from electrical current and to component damage if an electrical fault occurs.
Always reconnect the earth conductors.

Please note
Wait **at least 30 min** between the installation and the commissioning of the appliance to prevent equipment damage.
Work on the **refrigerant circuit** must only be carried out by a qualified **refrigeration engineer**.

Writing reports

Enter measurements taken during commissioning (described in the following) into the reports from page 236 onwards.

Checking the refrigeration circuit for leaks

If there are any leaks, have the heat pump module checked by a refrigeration engineer.

1. Remove front panel in reverse order.
2. When work is complete, close the heat pump; see page 115.

Regarding commissioning this appliance, see also the operating instructions.

Further details regarding the individual steps (cont.)

Filling and venting on the primary side

Please note
To prevent equipment damage, fill the primary circuit before connecting the power supply.

1. Check the pre-charge pressure of the expansion vessel (see page 121).
2. Fill the primary circuit with Viessmann heat transfer medium and vent.

   Note
   The system must be protected against frost down to –15 °C.
3. Check the connections for possible leaks. Replace faulty or displaced gaskets.

Filling and venting on the secondary side

Please note
To prevent equipment damage, protect electrical components on the control unit door from escaping liquids.

Note
***Before** filling the system, observe VDI 2035 sheet 1.*

1. Open any on-site non-return valves installed.
2. Check the pre-charge pressure of the expansion vessel (see page 121).
3. Fill (flush) and vent secondary circuit:
4. **Please note**
   To prevent equipment damage, check the flow and return connections of the secondary heat pump circuit for **leaks**. In case of leaks, immediately shut off the equipment, drain the water and check the seating of the seal rings. Replace all seal rings that may have become dislodged.
5. Check the system pressure and top up with water if required.
   Minimum system pressure: 0.8 bar
   Permiss. operating pressure: 2.5 bar

Further details regarding the individual steps (cont.)

Filling and venting the solar circuit

Danger
Overheated collector areas and overheated heat transfer medium can cause burns/scalding and equipment damage.
When working on the collector and the solar circuit with heat transfer medium, protect the collector areas against solar irradiation.

1. Check the pre-charge pressure of the diaphragm expansion vessel.
2. **Please note**

   To prevent equipment damage, only fill the solar circuit with Tyfocor LS.
3. Vent the solar circuit.
   Minimum system pressure: 1.7 bar
   Permiss. operating pressure: 6 bar

Checking expansion vessels and the primary circuit/heating circuit pressure

Observe design information.
Vitocal technical guide

Commissioning assistant

The commissioning assistant guides you automatically through all the menus where settings have to be made.

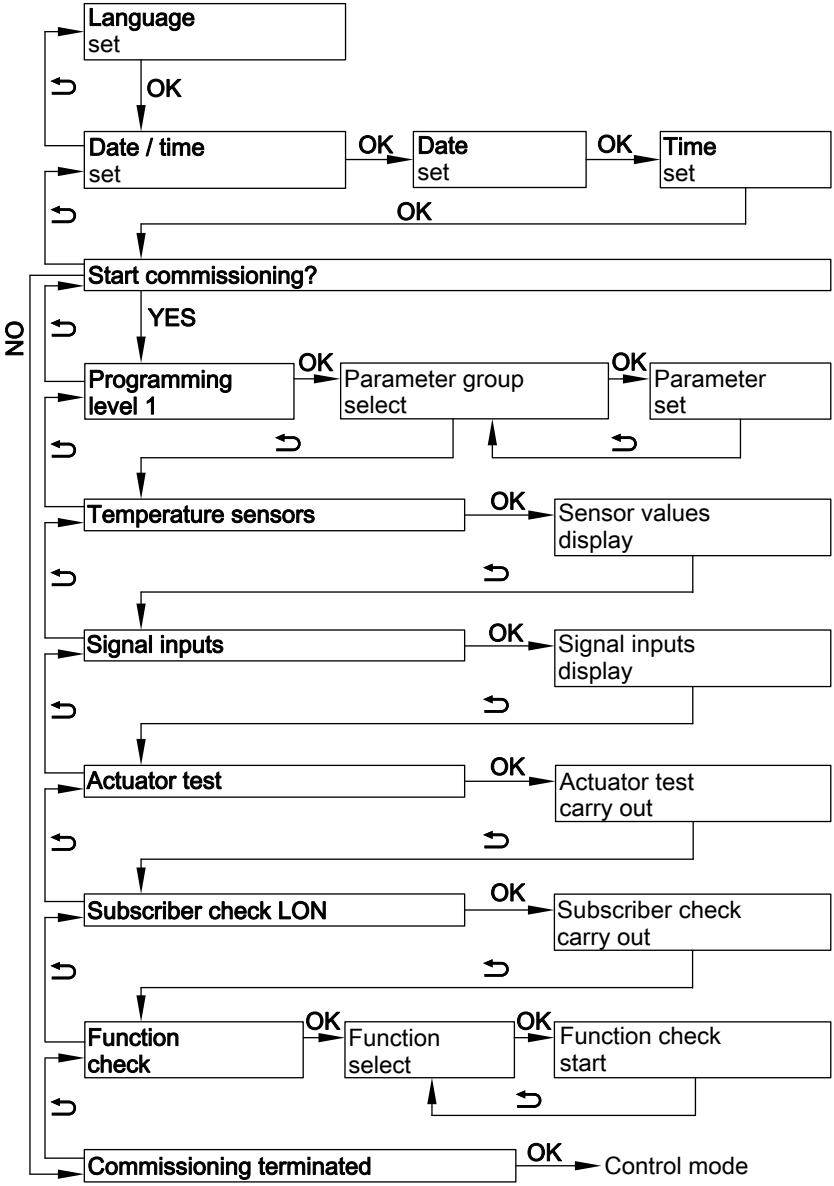
Please note
Incorrect operation at "**Coding level 1**" can result in damage to the appliance and heating system.
Always observe the installation and service instructions; failure to observe these will void your warranty rights.

Note
- *The scan **"Start commissioning assistant?" only** appears during initial commissioning.*
- *The configuration, parameter settings and function check can also be carried out without the commissioning assistant (see page 171, separate menu structure and operating instructions).*
- *When the unit is first commissioned, the display is in German:*

Further details regarding the individual steps (cont.)

- *Messages are displayed by manually controlling some components during commissioning. These do not indicate appliance faults.*

Further details regarding the individual steps (cont.)



Further details regarding the individual steps (cont.)

Integrating a heat pump control unit into a LON

The LON communication module (accessory) must be plugged into the heat pump control unit (see page 79).

Note
The data transfer via the LON system can take several minutes.

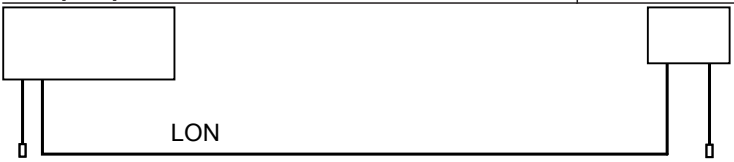
LON system number and LON subscriber number

Set the LON system number, LON subscriber number and other functions at the **"Coding level 1"** setting level (see from page 215).

Setting other LON subscribers:
See service instructions of further LON subscribers (e.g. Vitocom) and the following table.

Note
In the same LON system, one number can only be allocated once.
***Only one control unit** per system may be programmed as the fault manager.*

Example: Heat pump and Vitocom

Heat pump control unit	**Vitocom**
	
LON communication module installed Parameter setting: **"LON module installed"** set to **"1"**	—
Subscriber no. 1 Parameter setting: **"Subscriber number 7710"** set to **"1"**	Subscriber no. 99
Viessmann system number Parameter setting: **"System number 7798"** set to **"1"**	—
Control unit is fault manager Parameter setting: **"Fault manager 7779"** set to **"1"**	Device is fault manager
Control unit transmits the time Parameter setting: **"Time 77FF"** set to **"2"**	Device receives the time

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Further details regarding the individual steps (cont.)

Heat pump control unit	Vitocom
Control unit transmits outside temperature Parameter setting: **"Outside temperature 7797"** set to **"2"**	—
LON subscriber fault monitoring Parameter setting: **"Receive heartbeat 779C"** set to **"20"**	—

Carrying out subscriber check

In conjunction with LON.
Communication with the system devices connected to the fault manager is tested with a subscriber check.

Preconditions:
- The heat pump control unit **must be programmed as the fault manager** (**"Fault manager"**)
- The LON subscriber number must be programmed in all control units (see page 124)
- The fault manager LON subscriber list must be up to date

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Communication"**
4. **"LON subscriber"**

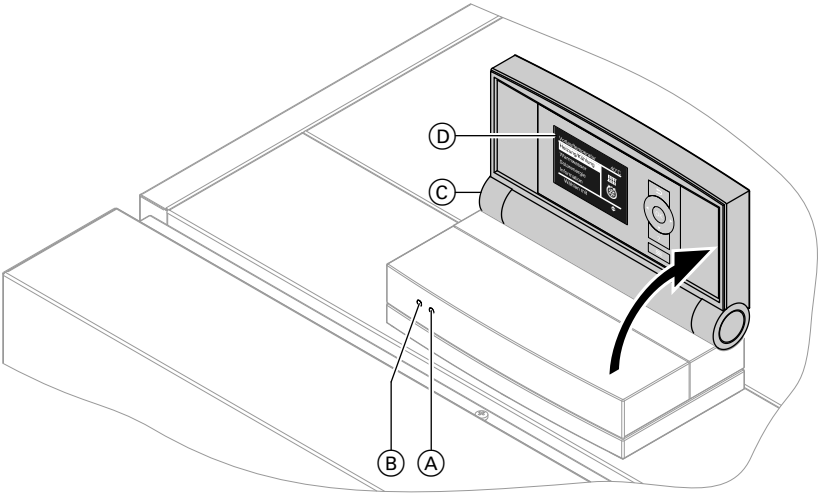
Displaying:
- **"Check"**: Subscriber check runs; **"LON – WINK"** flashes for 30 s on the display of the selected subscriber (if installed).
- **"Check OK"**
- **"Check NOK"**: No communication between the two devices. Check the LON connection and codes; restart subscriber check.

Instructing the system user

The system installer must hand the operating instructions to the system user and instruct him/her in the operation of the system.

Messages

Scanning messages



Note
When opening up the heat pump control unit, the top part of the control unit clicks into a specific position. You can change this position by pushing Ⓒ on the side.

Ⓐ ON indicator (green)
Ⓑ Fault indicator (red)
Ⓒ Button to change the end-stop position
Ⓓ Top part of the control unit with integral programming unit

If messages are pending, the message symbol flashes in the display (⚠, △, 🔔). For faults (⚠), fault indicator Ⓑ also flashes.
Show the message text and message code by pressing **OK** (see "Message overview").

Note	
Outside temp sensor	18
Power-OFF	C5
Acknowledge with	OK

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Messages (cont.)

Explanation of messages

Fault "⚠"
- The central fault message terminal is activated.
- Message via communication facility (e.g. Vitodata, Vitocom) possible.
- The system is no longer in standard mode; the fault must be removed **as quickly as possible**.

Warning "△"
- The operation of the appliance is limited and the cause of the warning must be removed.

Note "🔔"
- The appliance retains its functionality, however the information needs to be noted.

Acknowledging messages and recalling acknowledged messages


Operating instructions

Calling up messages from the message history

- Messages cannot be acknowledged in the message history.
- The messages are listed in order of occurrence with the most recent first.
- Up to 30 entries are stored.

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Message history"**
3. Press **OK** to scan information about the required message.

Note
The service menu remains active until it is deactivated with ***"Terminate service?"****, or if no operation takes place for 30 minutes.*

Message overview

All messages are identified by a two-digit code.

Message		
System characteristics	**Cause**	**Measures**
02 Std after data error		
	Delivered condition set after recognition of data fault	Reconfigure system.

Messages (cont.)

Message System characteristics	Cause	Measures
03 Configuration fault		
	System configuration fault: ■ Incorrect system scheme (contains non-supported heating circuit) ■ Max. flow temperature for heating circuit < min. flow temperature for cooling the heating circuit ■ Cooling for unavailable heating circuit	Check and match associated parameters, reset to delivered condition if required (**"Reset"**, see operating instructions), and reconfigure system. Contact your local heating contractor if the cause of the fault cannot be remedied.
05 Fault EEV 1		
	Fault message from EEV controller (refrigerant circuit control)	Observe messages in heat pump module diagnosis (see page 154).
06 Fault EEV 2		
	Fault message from EEV controller (refrigerant circuit control), heat pump stage 2 (type BWS)	Observe messages in heat pump module diagnosis (see page 154).
07 Message EEV 1		
	Message from EEV controller (refrigerant circuit control), heat pump stage 1 (type BW)	Observe messages in heat pump module diagnosis (see page 154).
08 Message EEV 2		
	Message from EEV controller (refrigerant circuit control), heat pump stage 2 (type BWS)	Observe messages in heat pump module diagnosis (see page 154).
10 Outside temp sensor		
Operation with outside temperature -40 °C	Short circuit, outside temperature sensor	Check resistance (Ni 500) at plug-in connection F0; replace sensor if required.

Messages (cont.)

Message System characteristics	Cause	Measures
18 Outside temp sensor		
Operation with outside temperature -40 °C	Lead break, outside temperature sensor	Check resistance (Ni 500) at plug-in connection F0; replace sensor if required.
20 Flow sensor secondary		
Operation with temperature value of return temperature sensor in secondary circuit, plus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump stops (message A9)	Short circuit, secondary circuit flow temperature sensor	Check resistance (Pt 500) at plug-in connection F8 and terminals X5.8/X5.9; replace sensor if required.
21 Return sensor sec.		
Operation with temperature value of flow temperature sensor in secondary circuit, minus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump stops (message A9)	Short circuit, return temperature sensor, secondary circuit, heat pump stage 1 (type BW)	Check resistance (Pt 500) at plug-in connection F9 and terminals X5.10/ X5.11; replace sensor if required.
22 Return sensor sec. 2		
Operation with temperature value of flow temperature sensor in secondary circuit, minus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump stops (message A9)	Short circuit, return temperature sensor, secondary circuit, heat pump stage 2 (type BWS)	Check resistance (Pt 500) at plug-in connection F18 and terminals X6.6/X6.7; replace sensor if required.

Messages (cont.)

Message System characteristics	Cause	Measures
28 Flow sensor secondary Operation with temperature value of return temperature sensor in secondary circuit, plus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump stops (message A9)	Lead break, secondary circuit flow temperature sensor	Check resistance (Pt 500) at plug-in connection F8 and terminals X5.8/X5.9; replace sensor if required.
29 Return sensor sec. Operation with temperature value of flow temperature sensor in secondary circuit, minus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump stops (message A9)	Lead break, return temperature sensor, secondary circuit, heat pump stage 1 (type BW)	Check resistance (Pt 500) at plug-in connection F9 and terminals X5.10/ X5.11; replace sensor if required.
2A Return sensor sec. 2 Operation with temperature value of flow temperature sensor in secondary circuit, minus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump stops (message A9)	Lead break, return temperature sensor, secondary circuit, heat pump stage 2 (type BWS)	Check resistance (Pt 500) at plug-in connection F18 and terminals X6.6/X6.7; replace sensor if required.
30 Flow sensor primary Operation with temperature value of return temperature sensor in primary circuit, plus 3 K. If both temperature sensors (primary flow and return) are faulty, the heat pump stops (message A9)	Short circuit, temperature sensor, primary circuit (heat pump brine inlet)	Check resistance (Pt 500) at plug-in connection F2 and terminals X5.2/X5.3; replace sensor if required.

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Messages (cont.)

Message System characteristics	Cause	Measures
31 Return sensor primary		
Operation with temperature value of flow temperature sensor in primary circuit, minus 2 K. If both temperature sensors (primary flow and return) are faulty, the heat pump stops (message A9)	Short circuit, primary circuit temperature sensor, brine outlet	Check resistance (Pt 500) at plug-in connection F3 and terminals X5.4/X5.5; replace sensor if required.
38 Flow sensor primary		
Operation with temperature value of return temperature sensor in primary circuit, plus 3 K. If both temperature sensors (primary flow and return) are faulty, the heat pump stops (message A9)	Lead break, flow temperature sensor, primary (heat pump brine inlet)	Check resistance (Pt 500) at plug-in connection F2 and terminals X5.2/X5.3; replace sensor if required.
39 Return sensor primary		
Operation with temperature value of flow temperature sensor in primary circuit, minus 2 K. If both temperature sensors (primary flow and return) are faulty, the heat pump stops (message A9)	Lead break, primary return temperature sensor (brine outlet)	Check resistance (Pt 500) at plug-in connection F3 and terminals X5.4/X5.5; replace sensor if required.
40 Flow sensor HC2		
Mixer heating circuit M2 is closed	Short circuit, flow temperature sensor in heating circuit with mixer M2	Check resistance (Ni 500) at plug-in connection F12; replace sensor if required.
41 Flow sensor HC3		
Mixer heating circuit M3 is closed	Short circuit, flow temperature sensor in heating circuit with mixer M3	Check sensor and replace if necessary (see installation instructions for extension kit for heating circuit with mixer).

Messages (cont.)

Message System characteristics	Cause	Measures
43 Flow sensor system		
	Short circuit, system flow temperature sensor (downstream of heating water buffer cylinder)	Check resistance (Pt 500) at plug-in connection F13; replace sensor if required.
44 Flow sensor cooling		
	Short circuit, flow temperature sensor, cooling circuit	Check resistance (Ni 500) at plug-in connection F14; replace sensor if required.
48 Flow sensor HC2		
Mixer heating circuit M2 is closed	Lead break, flow temperature sensor in heating circuit with mixer M2	Check resistance (Ni 500) at plug-in connection F12; replace sensor if required.
49 Flow sensor HC3		
Mixer heating circuit M3 is closed	Lead break, flow temperature sensor heating circuit M3	Check sensor and replace if necessary (see installation instructions for extension kit for heating circuit with mixer).
4B Flow sensor system		
	Lead break, system flow temperature sensor (downstream of heating water buffer cylinder)	Check resistance (Pt 500) at plug-in connection F13; replace sensor if required.
4C Flow sensor cooling		
	Lead break, flow temperature sensor, cooling circuit	Check resistance (Ni 500) at plug-in connection F14; replace sensor if required.
50 DHW sensor top		
DHW heating is blocked	Short circuit, top cylinder temperature sensor	Check resistance (Pt 500) at plug-in connection F6 and terminals X6.2/X6.1; replace sensor if required.

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Messages (cont.)

Message System characteristics	Cause	Measures
54 DHW solar		
No heating of the DHW cylinder/primary store by the solar thermal system; solar circuit pump remains OFF	Short circuit, Vitosolic cylinder temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
58 DHW sensor top		
DHW heating is blocked	Lead break, cylinder temperature sensor F6	Check resistance (Pt 500) at plug-in connection F6 and terminals X6.2/X6.1; replace sensor if required.
5C DHW solar		
No heating of the DHW cylinder/primary store by the solar thermal system; solar circuit pump remains OFF	Lead break, Vitosolic cylinder temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
60 Buffer cylinder sensor		
Buffer cylinder is heated once every hour. Heating stops according to set value of the return temperature sensor	Short circuit, buffer cylinder temperature sensor	Check resistance (Pt 500) at plug-in connection F4 and terminals X5.6/X5.7; replace sensor if required.
63 Ext. heat source		
External heat source is blocked. Instantaneous heating water heater (if installed) is enabled	Short circuit, external heat source temperature sensor	Check pressure drop value (Pt 500) at plug-in connection F20 and terminals X6.8/X6.9; replace sensor if required.
68 Buffer cylinder sensor		
Buffer cylinder is heated once every hour. Heating stops according to set value of the return temperature sensor	Lead break, buffer cylinder temperature sensor	Check resistance (Pt 500) at plug-in connection F4 and terminals X5.6/X5.7; replace sensor if required.

Messages (cont.)

Message System characteristics	Cause	Measures
6B Ext. heat source External heat source is blocked. Instantaneous heating water heater (if installed) is enabled	Lead break, external heat source temperature sensor	Check pressure drop value (Pt 500) at plug-in connection F20 and terminals X6.8/X6.9; replace sensor if required.
70 Room sensor HC1 ■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control	Short circuit, room temperature sensor heating circuit A1	Check remote control sensor and replace if required (see Vitotrol service instructions).
71 Room sensor HC2 ■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control	Short circuit, room temperature sensor heating circuit M2	Check remote control sensor and replace if required (see Vitotrol service instructions).
72 Room sensor HC3 ■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control	Short circuit, room temperature sensor heating circuit M3	Check remote control sensor and replace if required (see Vitotrol service instructions).
73 Room sensor SKK	Short circuit, room temperature sensor, cooling circuit	Check resistance (type Ni 500) at plug-in connection F16; replace sensor if required.

Messages (cont.)

Message System characteristics	Cause	Measures
78 Room sensor HC1		
■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control	Lead break, room temperature sensor heating circuit A1	Check remote control sensor and replace if required (see Vitotrol service instructions).
79 Room sensor HC2		
■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control	Lead break, room temperature sensor heating circuit M2	Check remote control sensor and replace if required (see Vitotrol service instructions).
7A Room sensor HC3		
■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control	Lead break, room temperature sensor heating circuit M3	Check remote control sensor and replace if required (see Vitotrol service instructions).
7B Room sensor SKK		
	Lead break, room temperature sensor, cooling circuit	Check resistance (type Ni 500) at plug-in connection F16; replace sensor if required.
92 Collector sensor		
	Short circuit, Vitosolic collector temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
93 Return sensor solar		
	Short circuit, Vitosolic return temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).

Messages (cont.)

Message System characteristics	Cause	Measures
9A Collector sensor		
	Lead break, Vitosolic collector temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
9B Return sensor solar		
	Lead break, Vitosolic return temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
A6 Secondary pump		
	No flow in secondary circuit (secondary circuit pump stopped)	Check voltage at connection 211. 2 and check secondary pump mechanically; replace if required.
A7 Solar circuit		
	No flow in solar circuit (solar circuit pump stopped)	Check voltage at connection between the solar circuit pump and Vitosolic and check solar circuit pump; replace if required (see Vitosolic installation and service instructions).
A8 Pump heating circuit 1		
	No flow in heating circuit A1 (circuit pump stopped)	Test voltage at connection 212.2 and check pump mechanically; replace if required.

Messages (cont.)

Message System characteristics	Cause	Measures
A9 Heat pump		
	Heat pump fault ■ Heat pump faulty ■ Safety high pressure switch has responded. ■ High pressure or low pressure sensor has responded 8 times within 24 h ■ Fault EEV controller ■ Temperature sensors in primary/secondary circuit faulty	Scan further messages ("Message history" see page 127); check volume flow rates, motor currents/ motor protection, and safety high pressure switch ***Note*** *After removing fault, switch appliance OFF and ON again once.*
AB Electric heater		
	Fault, instantaneous heating water heater (appliance faulty or high limit safety cut-out has responded; alternatively no temperature rise within 24 h)	⚠ **Danger** Contact with 'live' components can lead to severe injury from electric current. Isolate the power supply prior to starting work on the appliance.

Messages (cont.)

Message System characteristics	Cause	Measures
		■ Check power supply, connecting cable and plug for the instantaneous heating water heater. ■ Test instantaneous heating water heater control signal at connections 211.3 (stage 1) and 224.4 (stage 2); check high limit safety cut-out and reset if required; check instantaneous heating water heater.  Installation instructions, instantaneous heating water heater
AF Cylinder prim pump		
	■ Circulation pump for cylinder heating faulty ■ Circulation volume in primary store system too low; cylinder primary pump or two-way valve on primary store system faulty.	■ Circulation pump for cylinder heating: Test voltage at connection 211.4 and check pump mechanically; replace if required. ■ Cylinder primary pump/ two-way valve: Test voltage at connection 224.6 and check pump/valve mechanically; replace if required.

Messages (cont.)

Message System characteristics	Cause	Measures
B0 Device recognition		
	Error in recognising appliance version, incorrect coding card or PCBs faulty.	■ Check sensor input F11 on the controller and sensor PCB. No connection should be made at terminal F11. ■ Check coding card and replace if required. ■ Check PCBs and replace if required.
B1 KM BUS EEV		
	Communication fault with EEV controller (refrigerant circuit control), heat pump stage 1 (type BW)	Check KM BUS connection. At the connection between KM BUS and EEV, a fluctuating DC voltage between approx. 20 V and 30 V can be measured at the controller and sensor PCB at terminals X5.14 and X5.15 (connections are parallel to plug 145). Check leads/cables; check power supply to EEV controller PCB; replace PCB if required.

Messages (cont.)

Message System characteristics	Cause	Measures
B2 KM BUS EEV		
	Communication fault with EEV controller (refrigerant circuit control), heat pump stage 2 (type BWS)	Check KM BUS connection. At the connection between KM BUS and EEV, a fluctuating DC voltage between approx. 20 V and 30 V can be measured at the controller and sensor PCB at terminals X5.14 and X5.15 (connections are parallel to plug 145). Check leads/cables; check power supply to EEV controller PCB; replace PCB if required.
B4 A-D converter		
	Internal fault ADC (analogue digital converter, reference), ribbon cable between sensor PCB and main PCB faulty, or PCBs faulty	Check PCB; if required, replace in the following order: Controller and sensor PCB, main PCB, programming unit.
B5 EEPROM		
	Internal fault, EEPROM	Replace coding card.
B9 KM BUS solar		
	Communication error - KM BUS solar control unit, or sensor S3 of Vitosolic faulty	■ Check parameter **"Solar control unit type 7A00"**. ■ Check connection to Vitosolic. ■ Check Vitosolic sensors and replace if required (see Vitosolic installation and service instructions).

Messages (cont.)

Message System characteristics	Cause	Measures
BA KM BUS mixer HC		
	KM BUS communication error or internal fault in extension kit for one heating circuit with mixer M3	Check extension kit connections and code.
BB KM BUS mixer cooling		
	KM BUS communication error or internal fault in extension kit, NC-Box for cooling circuit	Check connections and parameter settings.
BC KM BUS R/C HC1		
	Communication error - KM BUS remote control; heating circuit without mixer A1	Check remote control connections and code; switch ON remote control.
BD KM BUS R/C HC2		
	Communication error - KM BUS remote control; heating circuit with mixer M2	Check remote control connections and code; switch ON remote control.
BE KM BUS R/C HC3		
	Communication error - KM BUS remote control; heating circuit with mixer M3	Check remote control connections and code; switch ON remote control.
BF Communication module		
	LON communication error; incorrect LON communication module	Check connections and type of communication module LON. Replace in the following order if required: ■ Control and sensor PCB ■ Ribbon cables between controller and sensor PCB and main PCB ■ Main PCB

Messages (cont.)

Message System characteristics	Cause	Measures
C2 Power supply monitor		
	Compressor power supply fault or phase monitor faulty	Check connections, phase connection and power supply; check phase monitor. The switching signal can be tested at connection 215.2.
C5 Power-OFF		
	Power-OFF enabled (triggered by power supply utility)	No measures required. If message persists: Check the cross connect PCB connections first at terminal X3.7 (feed) then at terminal X3.6 (230 V~).
C9 Refrigerant circuit		
	Refrigerant circuit fault, heat pump stage 1 (type BW): ■ Safety high pressure switch has responded. ■ Compressor motor protection (thermal relay) has responded ■ Klixon start-up resistor ■ If supplied: Separate compressor motor protection has responded	■ Check flow and return temperature sensors in primary and secondary circuits. ■ Check primary and secondary circuits for pressure and throughput (see also message A9). ■ Have heat pump tested by a refrigeration engineer. The switching signal can be tested at connection 215.4. ***Note*** *After removing fault, switch appliance OFF and ON again once.*

Messages (cont.)

Message System characteristics	Cause	Measures
CA Primary source		
	Primary circuit fault: ■ Primary circuit pressure switch/frost protection monitoring has responded ■ Primary pump thermal circuit breaker (heat pump stage 1, type BW or common primary pump)	■ Check safety equipment on cross connect PCB, terminals X3.9 and X3.8; in systems without safety equipment, check jumper between X3.9/X3.8. ■ Reset thermal relay, check primary pump and replace if required The switching signal can be tested at connection 215.3.
CB Primary temperature Heat pump stops.	Min. primary flow temperature (brine inlet) not achieved	Check primary circuit for flow rate.
CC Coding card		
	The coding card cannot be read	■ Check coding card and replace if required. ■ Check controller and sensor PCB and replace, if required.
CD KM BUS Vitocom		
	Communication error - KM BUS Vitocom 100	Check Vitocom 100 connections and connecting cables. Check connections at the controller and sensor PCB, plug 145 KM BUS. A fluctuating DC voltage between approx. 20 V and 30 V can be measured at the terminals.

Messages (cont.)

Message		
System characteristics	**Cause**	**Measures**
CE KM BUS ext. extension		
	Communication error - KM BUS external extension H1	Check external extension H1 connections and connecting cables. Check connections at the controller and sensor PCB, plug 145 KM BUS. A fluctuating DC voltage between approx. 20 V and 30 V can be measured at the terminals.
CF Communication module		
	Communication error - LON module in control unit	Check LON communication module and replace if required. If required, replace in the following order: ■ Control and sensor PCB ■ Ribbon cables between controller and sensor PCB and main PCB ■ Main PCB

Messages (cont.)

Message System characteristics	Cause	Measures
D1 Compressor		
	Compressor fault, heat pump stage 1 (type BW): ■ Compressor thermal relay has responded. ■ Separate compressor motor protection (if installed) has responded	■ Reset compressor thermal relay, check setting, restore delivered condition (**"Standard settings"**, see menu structure). ■ Check compressor electrical connections, test coil resistance of compressor motor. Check compressor phase sequence. ■ The switching signal (from thermal relay, separate motor protection) can be tested at connection 215.7. ***Note*** *If overheating occurs, internal motor protection prevents a re-enabling of the compressor for 1-3 hours.* ■ If required, have compressor tested by a refrigeration engineer.

Messages (cont.)

Message System characteristics	Cause	Measures
D3 Low pressure		
	Low pressure fault, heat pump stage 1 (type BW): ■ Heat pump faulty ■ Primary pump faulty ■ Low pressure sensor has reported a fault or is faulty	■ Have heat pump tested by a refrigeration engineer. ■ Check pressure gauge, primary pump and shut-off facilities. ■ Check low pressure sensor, lead and EEV PCB, and replace if required. The signal from plug 116 can be tested at connection 215.5. (Delivered condition: Jumper installed between terminals 116.3/116.4). If a pressure sensor is installed, the signal must be continuously active.
D6 Flow switch		
	Well circuit flow switch cannot detect a flow	■ Check well pump. ■ Check primary circuit. ■ If no flow switch is installed, insert a jumper between X3.3/X3.4. The signal can be tested at connection 216.3 or across terminals X3.3/X3.4.

Messages (cont.)

Message System characteristics	Cause	Measures
DA Compressor 2		
	Compressor fault, heat pump stage 2 (type BWS): ■ Compressor thermal relay has responded. ■ Separate compressor motor protection (if installed) has responded ■ Klixon start-up resistor ■ If supplied: three phase monitor has detected a fault or is faulty	■ Reset compressor thermal relay, check setting, restore delivered condition (**"Standard settings"**, see menu structure). ■ Check compressor electrical connections, test coil resistance of compressor motor. Check compressor phase sequence. ■ The switching signal (from thermal relay, separate motor protection) can be tested at connection 214.5. ***Note*** *If overheating occurs, internal motor protection prevents a re-enabling of the compressor for 1-3 hours.* ■ If required, have compressor tested by a refrigeration engineer.

Messages (cont.)

Message System characteristics	Cause	Measures
DB Refrigerant circuit 2		
	Refrigerant circuit fault, heat pump stage 2 (type BWS): ■ Safety high pressure switch has responded. ■ Compressor motor protection (thermal relay) has responded ■ If supplied: separate compressor motor protection has responded	■ Check flow and return temperature sensors in primary and secondary circuits. ■ Check primary and secondary circuits for pressure and throughput (see also message A9). ■ Have heat pump tested by a refrigeration engineer. The switching signal can be tested at connection 214.2. ***Note*** *After removing fault, switch appliance OFF and ON again once.*
DC Low pressure 2		
	Low pressure fault, heat pump stage 2 (type BWS): ■ Heat pump faulty ■ Primary pump faulty ■ Low pressure sensor has reported a fault or is faulty	■ Have heat pump tested by a refrigeration engineer. ■ Check pressure gauge, primary pump and shut-off facilities. ■ Check low pressure sensor, lead and EEV PCB, and replace if required. The signal from plug 116 can be tested at connection 214.3. (Delivered condition: Jumper installed between terminals 116.3/116.4). If a pressure sensor is installed, the signal must be continuously active.

Messages (cont.)

Message System characteristics	Cause	Measures
DE Primary source 2		
	Primary circuit fault: ■ Primary circuit pressure switch/frost protection monitoring has responded ■ Primary pump thermal circuit breaker, heat pump stage 2 (type BWS) ■ Three phase monitor has detected a fault or is faulty	■ Check safety equipment (frost protection, brine pressure, frost protection AC-Box) on cross connect PCB, terminals X3.9 and X3.8; in systems without safety equipment, check jumper between X3.9/ X3.8. ■ Reset thermal relay, check primary pump and replace if required The switching signal can be tested at connection 214.1.
E0 LON subscriber		
	LON subscriber has failed or connection is faulty	■ Call up fault memory at faulty subscriber. ■ Check address (system and subscriber numbers); check connections and LON connecting cables.
E1 Ext. heat generation		
	Fault - external heat source	Check external heat source.
E2 Fault lag heat pump		
	Fault at a lag heat pump in the cascade	Check heat pump control unit display at lag heat pump.
F2 Param. output 1/2		
	Compressor output not selected	Set **"Output compressor stage 5030/5130"** parameter accordingly.
FF New start		
	Control unit restart	No measures required.

Messages (cont.)

Note
*The system is out of use if **"Simulation"** is displayed. Connection F11 must **not** be assigned.*

Diagnosis (service scans)

Calling up diagnosis

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. Select required area, e.g. **"Heat pump"**

Scanning operating data

Operating data can be scanned in the following areas:

"System overview"	For further information, see page 151
"System"	For further details, see menu structure
"Heating circuit 1"	For further details, see menu structure
"Heating circuit 2"	If a heating circuit with mixer M2 is installed, see the menu structure for further details
"Heating circuit 3"	If a heating circuit with mixer M3 is installed, see the menu structure for further details
"Cooling circuit SKK"	If a separate cooling circuit is installed, see the menu structure for further details
"DHW"	For further details, see menu structure
"Solar"	If a solar thermal system is installed, see the menu structure for further details
"Heat pump"	For further information, see page 154
"Energy statement"	For further information, see page 160
"Temperature sensors"	For further details, see menu structure
"Signal inputs"	For further details, see menu structure
"Brief scan"	For further information, see page 161

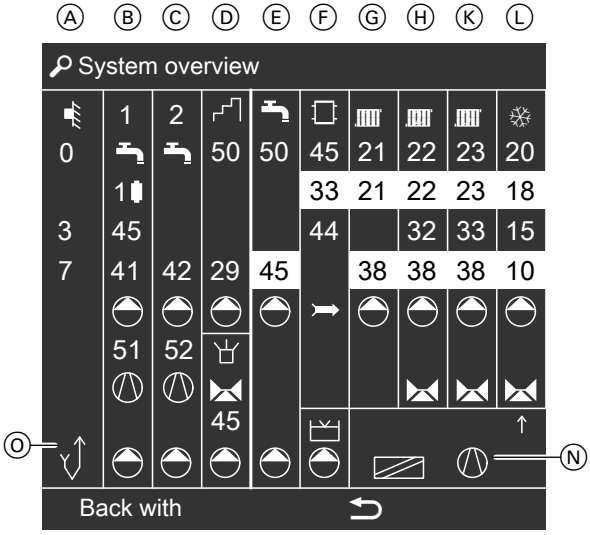
Diagnosis (service scans) (cont.)

Note
*Only connected temperature sensors are displayed. In case of faults, the display shows **"- - -"**.*

System overview

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"System overview"**

Note
The display depends on the system version (e.g. column Ⓗ: display only if heating circuit M2 is installed).
With some components the symbols move when they are operational (e.g. pumps).
The values shown are examples.



Ⓐ to Ⓛ For an explanation of the contents of columns Ⓐ to Ⓛ, see the following tables.

Ⓝ Cooling function:
- "natural cooling": ▨
- "active cooling": ▨ ◴

The arrow points at the heating/cooling circuit activated for cooling.

Ⓞ Geothermal probe symbol

Diagnosis (service scans) (cont.)

Ⓐ

	Outside temperature sensor
0	Outside temp
3	Primary circuit flow temperature (brine inlet temperature)
7	Primary circuit return temperature (brine outlet temperature)

Ⓑ

1	Refrigerant circuit (compressor stage 1)
	DHW heating via heat pump stage 1 (type BW)
1 or 2 or 3	Instantaneous heating water heater at stage 1 or Instantaneous heating water heater at stage 2 or Instantaneous heating water heater at stage 3
45	Secondary circuit flow temperature
41	Secondary circuit return temperature
	Secondary pump
51	Hot gas temperature
	Compressor stage 1 (type BW)
	Primary pump (primary source, common primary pump or primary pump heat pump stage 1)

Ⓒ

2	Refrigerant circuit (compressor stage 2)
	DHW heating via heat pump stage 2 (type BWS)
42	Secondary circuit return temperature
	Secondary pump
52	Hot gas temperature
	Compressor stage 2 (type BWS)
	Primary pump (primary source, heat pump stage 2)

Ⓓ

	Solar circuit
50	Collector temperature (collector temperature sensor)
29	Solar return temperature (cylinder temperature sensor) or DHW temperature sensor solar cylinder (connected to the Vitosolic)
	Solar circuit pump
or	External heat source or If an external heat source is in operation
	External heat source mixer
45	Boiler temperature, external heat source
	Circulation pump for cylinder reheating

Diagnosis (service scans) (cont.)

Ⓔ

	DHW
50	DHW temperature, top
45	Set DHW temperature
	Circulation pump for cylinder heating
	DHW circ pump

Ⓕ

	Heating water buffer cylinder
45	Heating water buffer cylinder temperature
33	Set temperature, heating water buffer cylinder
44	System flow temperature
	System flow
	Swimming pool
	Swimming pool circuit pump

Ⓖ

1	Heating circuit A1 (without mixer)
21	Room temperature
21	Set room temperature
38	Set heating circuit flow temperature
	Heating circuit pump

Ⓗ

2	Heating circuit with mixer M2
22	Room temperature
22	Set room temperature
32	Heating circuit flow temperature
38	Set heating circuit flow temperature
	Heating circuit pump
	Mixer

Ⓚ

3	Heating circuit with mixer M3
23	Room temperature
23	Set room temperature
33	Heating circuit flow temperature
38	Set heating circuit flow temperature
	Heating circuit pump
	Mixer

Ⓛ

	Separate cooling circuit
20	Room temperature
18	Set room temperature
15	Flow temperature, separate cooling circuit
10	Flow temperature, separate cooling circuit, set value
	"Cooling circuit pump": NC signal
	Mixer

Diagnosis (service scans) (cont.)

Heat pump module diagnosis

The refrigerant circuit is controlled by the EEV controller, which communicates permanently with the control unit via KM BUS.

You can scan the following information in the heat pump module diagnosis:
- Status and fault information of the EEV controller
- Current refrigerant circuit temperature and pressure values
- Last temperatures, evaporation and condensation pressures captured via the EEV controller
- Compressor hours run for the various load classes. A load class specifies the compressor operation at a certain differential of evaporation and condensation temperature $\Delta T_{V/K}$

Diagnosis overview

Single stage (type BW)

EEV module			
I	[-	] :	0100 4000 0101
Tsh, Tc	[°C] :		3.0, 68.0
pmop	[bara]:		15
Ts, Tc	[°C] :		-1.8, 60.3
ps, pc	[bara]:		6.95, 21.8
T1	[°C] :		31.4
x, P	[%	] :	58 , - - -
Err	[-	] :	00000001
Back with			⮌

Two stage (type BW/BWS): stage 1 (type BW)

EEV module 1			
I	[-	] :	0100 4000 0101
Tsh, Tc	[°C] :		3.0, 68.0
pmop	[bara]:		15
Ts, Tc	[°C] :		-1.8, 60.3
ps, pc	[bara]:		6.95, 21.8
T1	[°C] :		31.4
x, P	[%	] :	58 , - - -
Err	[-	] :	00000001
Back with			⮌

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"Heat pump"**
4. **"EEV module"**

Note
*The information displayed in **"EEV module"** is independent of the control unit fault codes.*

Diagnosis (service scans) (cont.)

Displays

Display	Explanation
I [–]	Information index (commands, status, versions): 12 digits, 4 different codes possible at each position, hexadecimal display; observe the subsequent display system
Tsh, Tc [°C]	Tsh: Set superheating temperature Tc: Set hot gas temperature for start of the vapour injection (EVI)
Pmop [bara]	Max. suction gas pressure ("maximum operating pressure") Max. evaporator operating pressure
Ts, Tc [°C]	Ts: Actual suction gas temperature Tc: Actual condensation temperature
Ps [bara]	Actual suction gas pressure
Pc [bara]	Actual condensation pressure
TI [°C]	Actual LPG temperature
x, P [%]	x: Last EEV position P: Most recent set value default for the compressor output, calculated by the control unit from current heat demand in the secondary circuit
Err [–]	Fault index (components, messages): 10 digits, 4 different codes possible at each position, hexadecimal display; observe the subsequent display system

Display system of information and fault index

Four different messages are possible at each position in the information index and fault index. The control unit displays these messages with the codes 1, 2, 4 and 8. If several messages are active simultaneously, the relevant codes are added hexadecimally. Hexadecimal totals are unique, i.e. the individual active codes can be determined according to the following table.

Active codes C

Display value	Active codes			
	1	2	4	8
"0"				
"1"	X			
"2"		X		
"3"	X	X		
"4"			X	
"5"	X		X	
"6"		X	X	
"7"	X	X	X	
"8"				X
"9"	X			X
"A" (≙10)		X		X
"B" (≙11)	X	X		X
"C" (≙12)			X	X
"D" (≙13)	X		X	X
"E" (≙14)		X	X	X
"F" (≙15)	X	X	X	X

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Diagnosis (service scans) (cont.)

How to analyse the information index and fault index

1. Check the display value for each position individually.
2. Determine active codes [C] from the table.
3. See tables [E] and [I] for explanations of active codes.

Information index "I" [I]

Position	Code	Explanation
Most recent commands transferred from the control unit to the EEV controller		
1	4	Message received regarding EEV controller restart
2	1	Enable refrigerant circuit control (EEV controller switches compressor on automatically when required)
	2	Enable vapour injection with EVI control circuit
	4	Cooling mode enabled
3	0	N/A
4	0	N/A
Most recent status reported by the EEV controller to the control unit		
5	1	Digital scroll relay enabled
	2	EVI valve enabled
	4	Refrigerant circuit control of heat pump control unit enabled via digital input
	8	Cooling mode enabled, start via digital input
6	1	Refrigerant circuit control of heat pump control unit enabled via KM BUS
	2	Vapour injection with EVI control circuit enabled via KM BUS
	4	Cooling mode enabled, start via KM BUS
	8	Compressor on
7	0	N/A
8	1	Compressor shutdown due to fault
Always specify the versions in case of questions		
9	0 to F	EEV controller hardware version, position 1
10	0 to F	EEV controller hardware version, position 2
11	0 to F	EEV controller software version, position 1
12	0 to F	EEV controller software version, position 2

Example:
Information index **"01 00 49 00 01 02"**

Diagnosis (service scans) (cont.)

Position	Display	Codes (Tab. C)	Explanation (Tab. I)
1	**"0"**	0	—
2	**"1"**	1	Enable refrigerant circuit control
3	**"0"**	0	—
4	**"0"**	0	—
5	**"4"**	4	Refrigerant circuit control of heat pump control unit enabled via digital input
6	**"9"**	1	Refrigerant circuit control of heat pump control unit enabled via KM BUS
		8	Compressor on
7	**"0"**	0	—
8	**"0"**	0	—
9	**"0"**	0	EEV controller hardware version 01
10	**"1"**	1	
11	**"0"**	0	EEV controller software version 02
12	**"2"**	2	

Fault index "Err" E

Position	Code	Explanation
Parts, fault messages reported directly from EEV controller		
1	1	LPG temperature sensor faulty
	2	EEV stepper motor faulty
2	1	Low pressure sensor faulty
	2	Suction gas temperature sensor faulty
	4	High pressure sensor faulty
	8	Hot gas temperature sensor faulty
3	0	N/A
4	0	N/A
Messages		
5	1	Inadequate evaporation pressure (low pressure shutdown)
6	1	Condensation temperature too high
	2	Condensation pressure too high
	4	Suction gas superheating temperature too low
	8	Suction gas superheating too high
7	0	N/A

Diagnosis (service scans) (cont.)

Position	Code	Explanation
8	1	Maximum operating pressure (MOP) was reached; control type (superheating/evaporation pressure control) in refrigerant circuit was adjusted.
	2	Fault due to impermissible combination of refrigerant circuit conditions. A serious EEV controller fault has occurred, as the heat pump control unit only transfers permissible parameter combinations to the EEV controller.

Example:
Information index **"0C 00 00 00"**

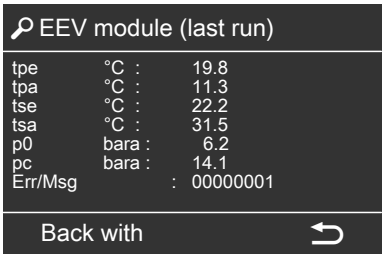
Position	Display	Codes (Tab. C)	Explanation (Tab. E)
1	**"0"**	0	—
2	**"C"**	4	High pressure sensor faulty, reported directly from EEV controller
		8	Hot gas temperature sensor faulty, reported directly from EEV controller
3	**"0"**	0	—
4	**"0"**	0	—
5	**"0"**	0	—
6	**"0"**	0	—
7	**"0"**	0	—
8	**"0"**	0	—

Temperature and pressure values

Most recent temperature and pressure values captured in primary and secondary circuits.

Note
While the compressor is running, the control unit in this overview displays the current test values. After the compressor has shut down, the last values measured during operation can be called up. These values are only overwritten when the compressor starts again.

Single stage (type BW)



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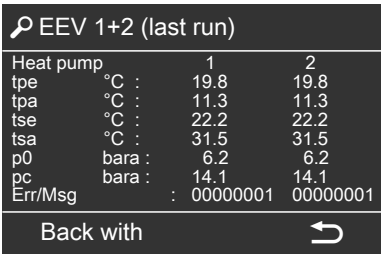
Diagnosis (service scans) (cont.)

Two stage (type BW/BWS):stages 1 and 2



Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"Heat pump"**
4. **"EEV module (last run)"**

Displays

Display	Explanation
tpe °C	Brine inlet temperature
tpa °C	Brine outlet temperature
tse °C	Secondary circuit return temperature
tsa °C	Secondary circuit flow temperature
p0 bara	Evaporation pressure
pc bara	Condensation pressure
Err/Msg	Last fault information code before a compressor shutdown; display system (see page 155) and explanation (see page 157) as before.

Compressor runtime (hours run according to load classes)

Single stage (type BW)

Two stage (type BW/BWS): stage 1 (type BW)

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**

Diagnosis (service scans) (cont.)

3. **"Heat pump"**
4. **"Runtime compressor"**

The compressor hours run (**"Hours run"**) can be scanned with ◆◆ for every **"Load class"**.

Assigning the load classes:

Load class	Hours run for $\Delta T_{V/K}$
1	$\Delta T_{V/K} < 25$ K
2	25 K < $\Delta T_{V/K} < 32$ K
3	32 K < $\Delta T_{V/K} < 41$ K
4	41 K < $\Delta T_{V/K} < 50$ K
5	$\Delta T_{V/K} > 50$ K

$\Delta T_{V/K}$ Differential, evaporation and condensation temperature

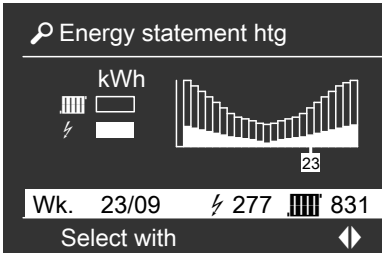
Energy statement

The following information can be scanned in the "**Energy statement**" menu:

- **"Energy statement htg"**: electrical energy ↯ used to operate the heat pump and the amount of heating energy transferred into the heating system.
- **"Energy statement DHW"**: electrical energy ↯ used to operate the heat pump and the amount of energy transferred into the heating system for DHW heating.
- **"SPF heating"**: seasonal performance factor for heating
- **"SPF DHW"**: seasonal performance factor for DHW heating
- **"SPF overall"**: seasonal performance factor overall

Service menu:

1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"Energy statement"**



The energy values , , ↯ can be scanned with ◆◆ for each calendar week **"Wk."** of the past year.

Note

*In order to record realistic data, the parameter **"Output"** must be set correctly.*

Diagnosis (service scans) (cont.)

Brief scan

In the brief scan, you can scan temperatures, software versions and connected components, for example.

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"Brief scan"**

For an explanation of the relevant values in the individual lines, see the following table:

Line (brief scan)	Field					
	1	**2**	**3**	**4**	**5**	**6**
1	Control unit: Software version (SW index)		Device: Version Coding card: ID Low		Coding card: Version	
2	System scheme		Number of KM BUS users	Common demand temperature		
3	0	Programming unit: Software index	Extension for heating circuit with mixer (M2/M3): Software version	Solar control unit: Software version	LON module: Software version	External extension: Software version
4	0	0	0	0	Appliance type	

Diagnosis (service scans) (cont.)

Line (brief scan)	Field					
	1	2	3	4	5	6
5	0: no external demand 1: external demand	0: no external blocking 1: external blocking	0	External 0 to 10 V hook-up Display in % 0: no external hook-up		
6	Number of LON subscribers		Check digit	0	0	0
7	Remote control: **Heating circuit without mixer A1:** 0 w/o 1 Vitotrol 200	Software version	**Heating circuit with mixer M2** 0 w/o 1 Vitotrol 200	Software version	**Heating circuit with mixer M3** 0 w/o 1 Vitotrol 200	Software version
8	EEV module 1: Hardware index		EEV module 1: Software index		Extension for heating circuit with mixer for cooling circuit/separate cooling circuit: Software version	
9	EEV module 2: Hardware index		EEV module 2: Software index		0	
10	Control unit: Software version High		Control unit: Software version Low		Programming unit: Software version	

Testing outputs (actuator test)

- Only actuators are shown that correspond to the actual system equipment level.
- Activating the actuator test switches all actuators to zero volt.
- One or several actuators can be started from this menu.
- The actuator test stops automatically after approx. 30 min or with ⮌.
- With ◆◆ **"System overview"** and the diagnosis page **"EEV module"** can be called up, **without** exiting the actuator test. Back to the actuator test display with **OK**.

Testing outputs (actuator test) (cont.)

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Actuator test"**

Note
- *If a cylinder primary pump is controlled via the PWM signal, activate **both** outputs **"Cylinder prim pump"**.*
- *All actuators can be switched off simultaneously with **"All actuators"**.*

Function check

To test the function of connected components (see commissioning assistant, page 121).

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Function check"**
4. Select required group, e.g. **"DHW"**.

"Function check" menu

Function	System characteristics
Heating circuit 1	Secondary pump and heating circuit pump A1 are started.
Heating circuit 2 Heating circuit 3	Heating circuit pump M2 or M3 is started. Open/close mixer every 5 min.
Separate cooling circuit	Primary pump and circulation pump, separate cooling circuit are started. Open/close mixer every 5 min.
DHW (DHW cylinder)	Secondary pump, circulation pump for cylinder heating (heating water side) and cylinder primary pump (DHW side) are started.
Swimming pool	Secondary pump is started. Swimming pool output is switched on/off every minute.
Electric heater (instantaneous heating water heater, accessory)	Secondary pump is started. Instantaneous heating water heater regulates to a flow temperature of 30 °C.
Heat pump	Primary and secondary pumps are started. Heat pump regulates to a return temperature of 30 °C.
Ext. heat source	The external heat source is regulated to a flow temperature of 35 °C. Open mixer, heating circuit pumps are started.

Function check (cont.)

Function	System characteristics
Solar	If the Vitosolic is connected, the display for the solar circuit pump is activated in the system overview. Start the solar circuit pump via the Vitosolic (see Vitosolic service instructions).
Primary source ***Note*** *The execution of this function lasts 10 min.*	The primary pump starts. The primary circuit flow temperature is averaged every minute. ***Note*** *This function determines the temperature of the undisturbed ground.* *If the function is terminated earlier, the average value calculated at the time of the termination is saved.*

Steps if the room temperature is too low

1. Vent the heating circuits.
2. Check throughput of affected heating circuits. Recommended temperature differential between heating flow and return approx. 8 K.
3. Hydraulically balance the connected heating circuits.
4. Check the outside temperature sensor (see page 166).
5. Increase the set room temperature for standard mode and match the heating curves.

    Operating instructions
6. Enable heating operation via the integral instantaneous heating water heater (if installed) (see page 196).

No display indication on the programming unit

1. Switch ON system ON/OFF switch.
2. Check heat pump control unit fuse; replace if required (see page 167).
3. Check whether there is power at the control unit; switch ON power supply if required.
4. Check the plug-in and threaded connections.

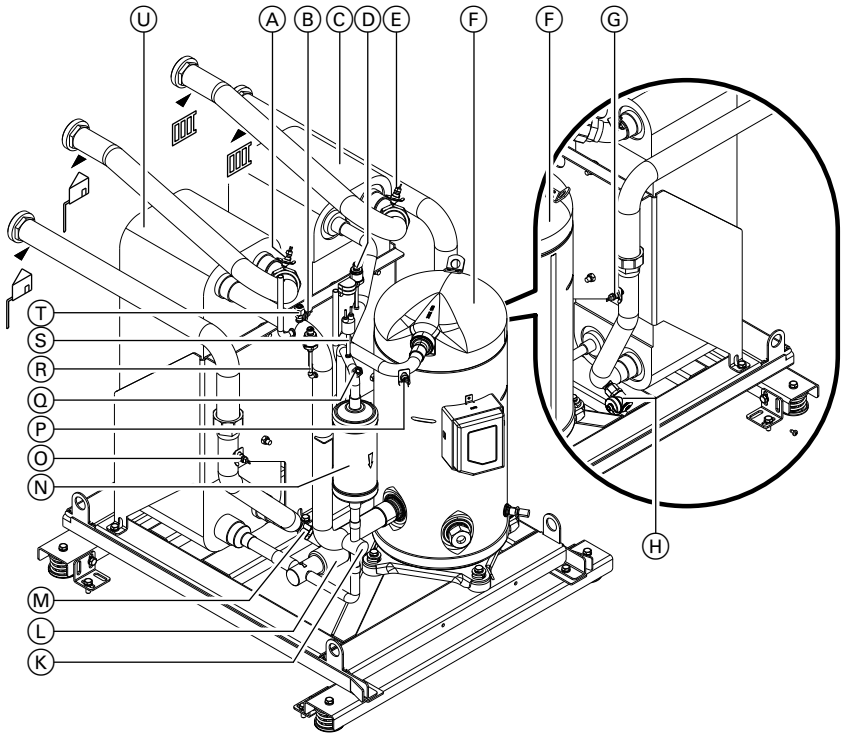
No display indication on the programming unit (cont.)

5. Replace programming unit if required.

6. Replace controller and sensor PCB if required.

Repairs

Overview of internal components



Ⓐ Primary circuit flow temperature sensor (heat pump brine inlet)
Ⓑ Suction gas temperature sensor
Ⓒ Condenser
Ⓓ High pressure sensor EEV
Ⓔ Secondary circuit flow temperature sensor
Ⓕ Compressor
Ⓖ Secondary circuit return temperature sensor
Ⓗ Drain valve on the secondary side
Ⓚ Sight glass
Ⓛ Electronic expansion valve (EEV)
Ⓜ Drain valve, primary side
Ⓝ Filter dryer

Repairs (cont.)

Ⓞ Primary circuit return temperature sensor (heat pump brine outlet)
Ⓟ Hot gas temperature sensor
Ⓠ Schrader high pressure valve
Ⓡ Low pressure sensor EEV
Ⓢ Safety high pressure switch
Ⓣ Schrader low pressure valve
Ⓤ Evaporator

Draining the heat pump on the primary/secondary side

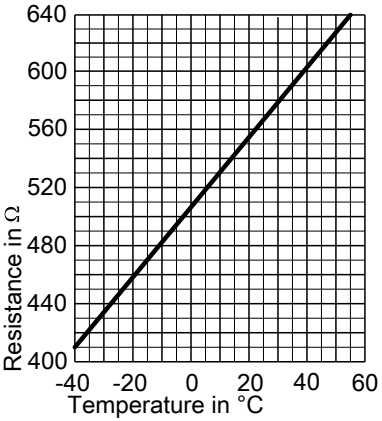
1. Close on-site drain & fill valve.
2. Drain heat pump at drain valve on primary/secondary side (see page 165).

Checking sensors

For sensor connections to the controller and sensor PCB, see page 228.

For the position of the sensors in the heat pump, see figure on page 165.

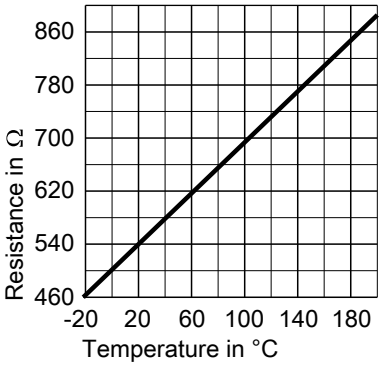
Temperature sensors type Ni 500



Capturing element: "Ni 500"
- Outside temperature sensor (F0)
- Flow temperature sensor, heating circuit M2 (F12)
- Flow temperature sensor, separate cooling circuit
- Room temperature sensors

Repairs (cont.)

Temperature sensors type Pt 500



Capturing element "Pt 500"
- Flow temperature sensor, system (F13)
- Buffer temperature sensor (F4)
- Cylinder temperature sensor (F6)
- Flow/return temperature sensor, secondary circuit (F8/F9)
- All sensors inside the heat pump
- Boiler temperature sensor, external heat source

Checking the fuse

For fuse locations, see from page 220:
- Fuse F1 is located on the cross connect PCB.
- Fuse F3 is located on the main PCB.

Fuse F1 and F3:
- 6.3 A (slow), 250 V~
- Max. power loss ≤ 2.5 W

Danger
Contact with 'live' components can lead to severe injury from electric current.
Before working on the equipment, always ensure that **the power circuit is also at zero volt.**
Removing the fuse does **not switch the power circuit to zero volt**.

Appliance too noisy

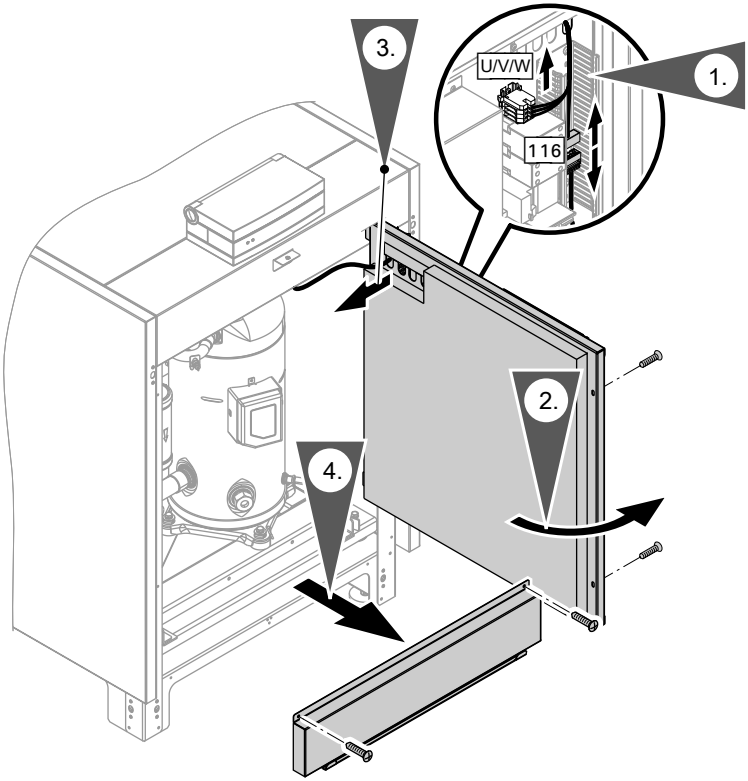
Possible causes:
- Transport brackets not removed or not secured to the base carrier: See page 68.
- Control unit door not tightly sealed: See page 116.
- Base sheets not fitted: See page 116 step 5.
- Clearance between the base sheet and floor is too great.

Repairs (cont.)

Removing the heat pump module

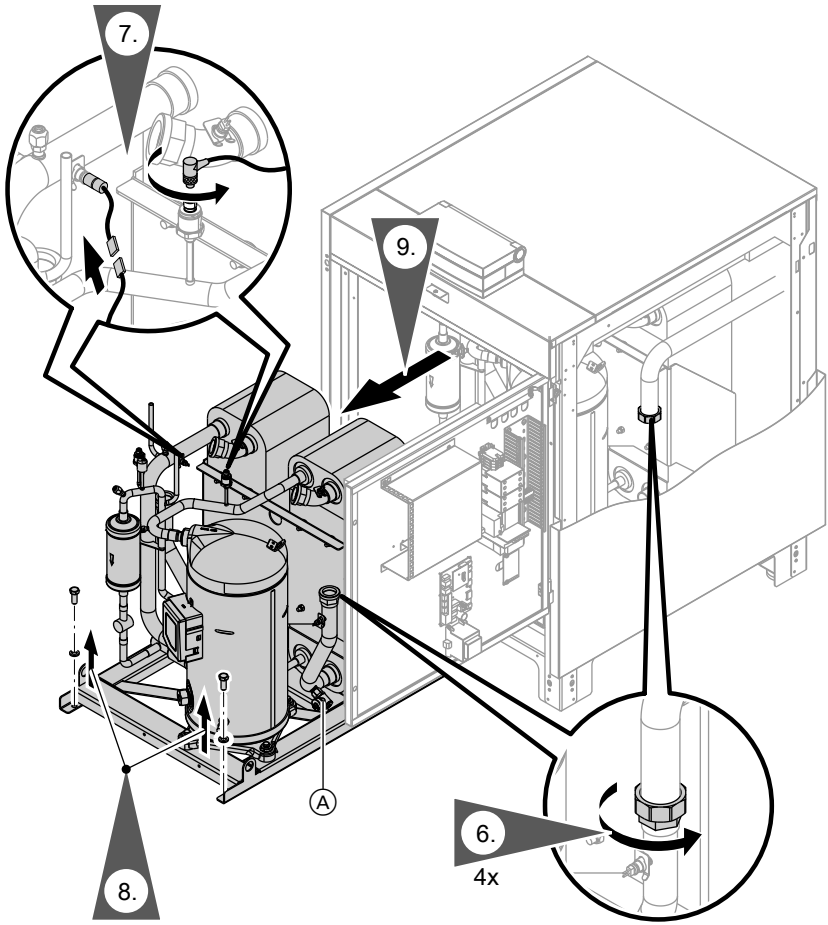
! **Please note**
Avoiding device damage.

Never put weight on the top, front or side panels of the appliance.



5. Drain the primary and secondary side (for drain valves, see page 165).

Repairs (cont.)



Note on step 7.
Identify the plug-in and threaded connections that belong together.
Disconnect all electrical connections.

! **Please note**
Installing a compressor at a steep angle inside the heat pump can result in equipment damage.
Never tilt the heat pump module more than 45°.

Repairs (cont.)

Note on step 9.
To stabilise the heat pump module on the carrier, the transport brackets can be screwed on (see page 68).

Installing the heat pump module

Install in reverse order to removal.

! **Please note**
To prevent the formation of condensate and extreme noise development,
tightly seal the control unit door.

! **Please note**
Seal the appliance to be sound-proof and diffusion-proof.
Check tightness of the internal and external hydraulic connections (see page 116).

Control unit settings by the contractor

The following pages **only** describe those parameters that can **only** be adjusted by specialists operating in the service menu at **"Coding level 1"**.
Customer level parameters that are described in the operating instructions are **not** explained here.

Note
The available parameters depend on the individual system configuration (e.g. parameters for heating circuit M2: display only if heating circuit M2 is configured).

! **Please note**
Incorrect operation at "**Coding level 1**" can result in damage to the appliance and heating system.
Always observe the installation instructions; failure to observe these will void your warranty rights.

Activating service menu

The service menu can be activated from any menu.

Press **OK** + ☰: simultaneously for approx. 4 s.

Disabling the service menu

The service menu remains active until it is deactivated with **"Terminate service?"**, or if no operation takes place for 30 minutes.

Setting parameters, using the example "System scheme"

To set a parameter, first select the parameter group and then the parameters.
All parameters are displayed as plain text. A parameter code is also assigned to each parameter.

Service menu:
1. Press **OK** + ☰: simultaneously for approx. 4 s.
2. Select **"Coding level 1"**.
3. Select parameter group: **"System definition"**
4. Select parameter: **"System scheme 7000"**
5. Adjust system scheme: **"2"**

Control unit settings by the contractor (cont.)

Alternatively, if the service menu was already activated:

Extended menu
1. ☰:
2. **"Service"**
3. Select **"Coding level 1"**.
4. Select parameter group: **"System definition"**
5. Select parameter: **"System scheme"**
6. Confirm parameter code: **"7000"**
7. Adjust system scheme: **"2"**

Note
The parameters shown depend on the current device settings.

Reinstating the delivered condition (Reset)

Service menu:
1. Press **OK** + ☰: simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Standard setting"**
4. **"All groups"**
   or
   Select required parameter group (e.g. **"System definition"**).

Parameter group system definition

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"System definition"**
4. Select parameter.

7000 System scheme

"System scheme 7000"

Adjust the system scheme during commissioning according to the system version. 12 different system schemes are available (see technical guide).

The components associated with the corresponding system scheme are automatically enabled and monitored.

Value	Heating circuit without mixer A1	Heating circuit with mixer M2	Heating circuit with mixer M3	DHW heating
"0"	—	—	—	X
"1"	X	—	—	—
"2"	X	—	—	X
"3"	—	X	—	—
"4"	—	X	—	X
"5"	X	X	—	—
"6"	X	X	—	X
"7"	—	X	X	—
"8"	—	X	X	X
"9"	X	X	X	—
"10"	X	X	X	X
"11"	External control			

Delivered condition 2
Setting 0 to 11

7001 Language

Note
Adjust only in the extended menu.

Language for operating and display elements in the control unit.

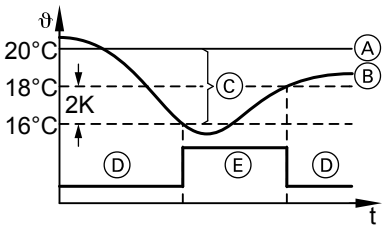
7001 Language (cont.)

Operating instructions

7003 Temperature differential for the heating limit

"Temperature differential heating 7003"

Temperature differential for calculating the heating limit.
Heating limit: Set room temperature minus **"Temperature differential heating"**
If the average outside temperature calculated over 3 hours falls below the heating limit, central heating starts.



Example:
The selected set room temperature is 20 °C; the value set under **"Temperature differential heating"** is 4 K.
This results in a heating limit of 16 °C (20 °C – 4 K).
Central heating commences if the average outside temperature drops below 16 °C (heating limit).
If the average outside temperature exceeds 18 °C, central heating stops (because of the specified hysteresis of 2 K).

Ⓐ Set room temperature
Ⓑ Adjusted average temperature
Ⓒ Selected value **"Temperature differential heating"**
Ⓓ Heating mode OFF
Ⓔ Heating mode ON

Delivered condition	40 (≙ 4 K)
Setting range	0 to 200 (≙ 0 to 20 K)

7004 Temperature differential for the cooling limit

"Temperature differential cooling 7004"

Temperature differential for calculating the cooling limit.

Cooling limit: Set room temperature plus **"Temperature differential cooling"**

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7004 Temperature differential for the cooling… (cont.)

If the average outside temperature calculated over 3 hours exceeds the cooling limit, room cooling is switched on.

Example:
The selected set room temperature is 20 °C; the value set under **"Temperature differential cooling"** is 4 K.
This results in a cooling limit of 24 °C (20 °C + 4 K).
Room cooling commences if the average outside temperature rises above 24 °C (cooling limit).

Room cooling stops if the average outside temperature falls below 23 °C (because of the specified hysteresis of 1 K).

Note
*This parameter is only available if cooling mode has been enabled via parameter **"Cooling 7100"** (see page 211).*

Delivered condition	40 (≙ 4 K)
Setting range	10 to 200 (≙ 1 to 20 K)

7010 External extension

"External extension 7010"

Enabling external extension H1.

External extension H1 can be used for the following hook-ups/components:
- Swimming pool water heating
- External changeover of the operating status
- External demand
- External mixer OPEN
- External blocking
- External mixer CLOSED

Note
***Only one** external extension can be connected to the control unit.*
*If the components for swimming pool heating are connected to "External extension H1", **no** additional hook-up (e.g. operating status changeover) can be connected to the "External extension H1".*

Value	Explanation
"0"	External extension H1 is not enabled.
"1"	External extension H1 is installed and enabled.

Delivered condition	0
Setting	0 / 1

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7008 Swimming pool

"Swimming pool 7008"

Swimming pool heating

Value	Explanation
"0"	Swimming pool will not be heated.
"1"	Swimming pool is connected and will be heated.

Note
*The thermostat for swimming pool temperature control is connected to the control unit via external extension H1. Set parameter **"External extension 7010"** to **"1"** (see page 175), otherwise the **"Swimming pool"** parameter will not be displayed.*

Delivered condition 0
Setting 0 / 1

700A Cascade

"Cascade control 700A"

The heat pump control unit enables the control of a cascade with up to three or four lag heat pumps. The connection can be made via LON or external extension H1.

Value	Explanation
"0"	No control of lag heat pumps.
"1"	Control of up to three lag heat pumps via external extension H1.
"2"	Control of up to four lag heat pumps via LON.

Note
*With setting **"1"** or **"2"**, the heat pump is the lead appliance. The number of lag heat pumps is set with parameter **"No. of external heat pumps 5735"**.*
*If the appliance is to work as a lag heat pump, the value **"0"**, and simultaneously the value **"11"** for parameter **"System scheme 7000"** must be selected. For connection via LON, **"Heat pump number 5707"** must also be set.*

Delivered condition 0
Setting 0 / 1 / 2

5735 Number of lag heat pumps

"No. of external heat pumps 5735"

5735 Number of lag heat pumps (cont.)

Number of lag heat pumps in a cascade that are connected via LON or via external extension H1.

Note
*Parameter **"Cascade control 700A"** on the lead appliance must be set to **"1"** (for control via external extension H1) or **"2"** (for control via LON).*

Value	Explanation
"0"	No lag heat pump
"1" to **"3"**	Number of lag heat pumps for control via external extension H1
"1" to **"4"**	Number of lag heat pumps for control via LON

Delivered condition 0
Setting 0 / 1 / 2 / 3 / 4

700B Output of lag heat pumps

"Output lag heat pump 700B"

Average type-dependent heating output of the lag heat pumps in a cascade, connected via external extension H1.

Delivered condition 10 kW
Setting 0 to 255 kW

7011 External operating status changeover

"Changing the heating circuit operating mode 7011"

The various operating statuses for heating/cooling, DHW heating and heating water buffer cylinder are switched on and off in the control unit via the relevant time program. It is also possible to change the operating status externally for a specific duration independently of the time program, e.g. via Vitocom 100.

Time program, operating status
Operating instructions

Parameter for setting which system components the operating status is changed over for when signal "External demand" is issued (signal active when the contact is closed, see overview of PCBs from page 220).
With the external operating status changeover, a heating circuit, for example, can be switched via a button from **"Reduc."** to **"Normal"**.

7011 External operating status changeover (cont.)

Note

- *The operating status to be set is specified with the parameter **"Effect of operating mode changeover 7012"**. The duration of the changeover is set with the parameter **"Duration of operating mode changeover 7013"**.*
- *The "External blocking" signal takes higher priority than the "External demand" signal.*
- *The function using the **"External demand mixer "OPEN" 7014"** parameter has a higher priority than the function using the **"Changing the heating circuit operating mode 7011"** parameter.*

Value	Heating circuit without mixer A1	Heating circuit with mixer M2	Heating circuit with mixer M3	DHW heating	Heating water buffer cylinder
"0"	—	—	—	—	—
"1"	X	—	—	—	—
"2"	—	X	—	—	—
"3"	X	X	—	—	—
"4"	—	—	X	—	—
"5"	X	—	X	—	—
"6"	—	X	X	—	—
"7"	X	X	X	—	—
"8" to **"15"**: Do not adjust.					
"16"	—	—	—	X	—
"17"	X	—	—	X	—
"18"	—	X	—	X	—
"19"	X	X	—	X	—
"20"	—	—	X	X	—
"21"	X	—	X	X	—
"22"	—	X	X	X	—
"23"	X	X	X	X	—
"24" to **"31"**: Do not adjust.					
"32"	—	—	—	—	X
"33"	X	—	—	—	X
"34"	—	X	—	—	X
"35"	X	X	—	—	X

7011 External operating status changeover (cont.)

Value	Heating circuit without mixer A1	Heating circuit with mixer M2	Heating circuit with mixer M3	DHW heating	Heating water buffer cylinder
"36"	—	—	X	—	X
"37"	X	—	X	—	X
"38"	—	X	X	—	X
"39"	X	X	X	—	X
"40" to **"47"**: Do not adjust.					
"48"	—	—	—	X	X
"49"	X	—	—	X	X
"50"	—	X	—	X	X
"51"	X	X	—	X	X
"52"	—	—	X	X	X
"53"	X	—	X	X	X
"54"	—	X	X	X	X
"55"	X	X	X	X	X
"56" to **"63"**: Do not adjust.					

Delivered condition 0
Setting range 0 to 63

7012 Operating status for external changeover

"Effect of operating mode changeover 7012"

Setting the operating status that is enabled for the individual system components with the external changeover (see also **"Changing the heating circuit operating mode 7011"**).

Value	Operating status (see operating instructions)		
	Heating/cooling	DHW	Heating water buffer cylinder
"0"	No heating, only frost protection of system components		
"1"	**"Reduc."**	**"Top"**	**"Top"**

7012 Operating status for external changeover (cont.)

Value	Operating status (see operating instructions)		
	Heating/cooling	DHW	Heating water buffer cylinder
"2"	**"Normal"**	**"Normal"**	**"Normal"**
"3"	**"Fixed val."** (set flow temperature is **"Maximum flow temperature 200E"**)	**"Temp. 2 "**(heating with **"Set temperature 2 600C"**)	**"Fixed val."** (heating with **"Fixed temperature 7202"**)

Delivered condition 2
Setting range 0 to 3

701A Pumps and compressor, external blocking

"External blocking effect 701A"

Setting to determine which pumps are blocked when function "External blocking" is enabled (see following table).

Note
*Observe setting for parameter **"External blocking mixer "CLOSED" 7015"** (see page 183).*

Value	Secondary pump/compressor blocked	Cylinder pump blocked	Heating circuit pump M3 blocked	Heating circuit pump M2 blocked	Heating circuit pump A1 blocked
"0"					
"1"					x
"2"				x	
"3"				x	x
"4"			x		
"5"			x		x
"6"			x	x	
"7"			x	x	x
"8"		x			
"9"		x			x
"10"		x		x	
"11"		x		x	x
"12"		x	x		
"13"		x	x		x
"14"		x	x	x	

701A Pumps and compressor, external blocking (cont.)

Value	Secondary pump/compressor blocked	Cylinder pump blocked	Heating circuit pump M3 blocked	Heating circuit pump M2 blocked	Heating circuit pump A1 blocked
"15"		x	x	x	x
"16"	x				
"17"	x				x
"18"	x			x	
"19"	x			x	x
"20"	x		x		
"21"	x		x		x
"22"	x		x	x	
"23"	x		x	x	x
"24"	x	x			
"25"	x	x			x
"26"	x	x		x	
"27"	x	x		x	x
"28"	x	x	x		
"29"	x	x	x		x
"30"	x	x	x	x	
"31"	x	x	x	x	x

Delivered condition 0
Setting 0 to 31

7013 Duration of external operating status changeover

"Operating mode changeover duration 7013"

Setting the **minimum** duration of external operating status changeover (see also **"Changing the heating circuit operating mode 7011"**). After expiry, the control unit switches back to the operating status that was enabled before the external changeover via the time program. This also occurs if party mode was enabled in the meantime.

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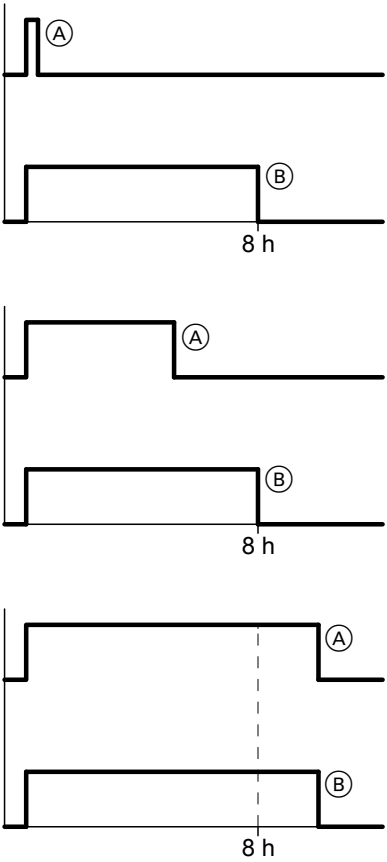
7013 Duration of external operating status… (cont.)

Example:



The diagram shows the duration of the external changeover Ⓑ, subject to signal duration Ⓐ, with parameter **"Duration of operating mode changeover 7013"** set to 8 h (delivered condition). The external operating status changeover is enabled for at least 8 h (delivered condition), independently of the length of the signal. If the signal lasts for longer than 8 h, the external operating status changeover remains enabled for as long as the signal is present.

Value	Duration
"0"	Changeover is only carried out as long as signal "External demand" is available.
"1" to **"12"**	Duration of the operating status changeover in hours, starting with the activation of the external operating mode changeover.

Delivered condition	8 h
Setting range	0 to 12 h

7014 External demand mixer "OPEN"

"External demand mixer "OPEN" 7014"

Setting for the way the signal "External demand" is to affect the heat pump and the heating circuits (signal active when the contact is closed; see overview of PCBs from page 220).

7014 External demand mixer "OPEN" (cont.)

Note

- *The "External blocking" signal takes higher priority than the "External demand" signal.*
- *See also "Set flow temperature, external demand" on page 202.*

Value	Heating circuit with mixer M2	Heating circuit with mixer M3	Heat demand to the heat pump
"0"	Control mode	Control mode	No
"1"	Mixer "Open"	Control mode	No
"2"	Control mode	Mixer "Open"	No
"3"	Mixer "Open"	Mixer "Open"	No
"4"	Control mode	Control mode	Yes
"5"	Mixer "Open"	Control mode	Yes
"6"	Control mode	Mixer "Open"	Yes
"7"	Mixer "Open"	Mixer "Open"	Yes

Delivered condition 4
Setting range 0 to 7

7015 External blocking mixer "CLOSED"

"External blocking mixer "CLOSED" 7015"

Setting for how the signal "External blocking" is to affect the heat pump (signal active when contact is closed; see summary of PCBs from page 220).

! **Please note**
The system may no longer be protected against frost.

Note

- *The "External blocking" signal takes higher priority than the "External demand" signal.*
- *See also parameter "Set flow temperature for external demand" on page 202.*

Value	Heating circuit with mixer M2	Heating circuit with mixer M3	Heat pump blocking
"0"	Control mode	Control mode	No
"1"	Mixer "Close"	Control mode	No
"2"	Control mode	Mixer "Close"	No

7015 External blocking mixer "CLOSED" (cont.)

Value	Heating circuit with mixer M2	Heating circuit with mixer M3	Heat pump blocking
"3"	Mixer "Close"	Mixer "Close"	No
"4"	Control mode	Control mode	Yes
"5"	Mixer "Close"	Control mode	Yes
"6"	Control mode	Mixer "Close"	Yes
"7"	Mixer "Close"	Mixer "Close"	Yes

Delivered condition 4
Setting range 0 to 8

7017 Vitocom 100

"Vitocom 100 7017"

Using the Vitocom 100 communication interface.

Delivered condition 0
Setting 0 / 1

Value	Explanation
"0"	Vitocom 100 is not used.
"1"	Vitocom 100 is installed and enabled.

701B Common system temperature sensor

"Common system sensor 701B"

In systems with a heating water buffer cylinder, a common flow temperature sensor ("System flow temperature sensor") can be installed in the heating water flow, downstream of the heating water buffer cylinder.

Value	Explanation
"0"	System flow temperature sensor is not used. The flow temperature sensor for the secondary circuit is not used.
"1"	System flow temperature sensor is installed and enabled.

Delivered condition 1
Setting 0 / 1

Parameter group compressor

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Compressor"**
4. Select parameter.

5000 Enable compressor

"Enable 5000"

Enabling the heat pump for operation.

Value	Explanation
"0"	Heat pump does not start, e.g. in the event of a fault.
"1"	Heat pump is enabled.

Note
To block the heat pump for drying a building, use parameter ***"Heat pump for drying a building 7300"****.*

Delivered condition	1
Setting	0 / 1

5030 Heat pump output

"Output compressor stage 5030"

Type-dependent heating output of heat pump.

This value is required to calculate the energy statement and seasonal performance factor.

Delivered condition	Specified via coding card according to rated heating output of heat pump (e.g. 8 kW for type 108; see type plate for rated heating output)
Setting range	1 to 255 kW

Parameter group compressor 2

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Compressor 2"**
4. Select parameter.

5100 Enabling heat pump stage 2

"Enable 5100"

Enabling the heat pump stage 2 (type BWS).

Delivered condition 0
Setting 0 / 1

Value	Explanation
"0"	Heat pump stage 2 is not used, e.g. in the event of a fault or if the output of stage 1 is permanently sufficient.
"1"	Heat pump stage 2 is used.

5130 Heat pump output

"Output compressor stage 2 5130"

Type-dependent heating output of heat pump stage 2.

This value is required to calculate the energy statement and seasonal performance factor.

Delivered condition: Specified via coding card according to rated heating output of heat pump stage 2 (e.g. 8 kW for type 108; see type plate for rated heating output)
Setting range: 1 to 255 kW

Parameter group external heat source

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Ext. heat source"**
4. Select parameter.

7B00 Enabling an external heat source

"External heat source 7B00"

To enable an additional, external heat source.
If there is a corresponding heat demand, the external heat source can also be started by the heat pump control unit.

Note
*All other parameters for the external heat source become visible only when this parameter has been set to **"1"**.*

Value	Explanation
"0"	External heat source is not used.
"1"	External heat source, e.g. oil condensing boiler is enabled.

Delivered condition 0
Setting 0 / 1

7B01 Priority of external heat sources

"Priority 7B01"

Priority of the external heat source over the instantaneous heating water heater (on site).

Value	Explanation
"0"	External heat source has priority.
"1"	Instantaneous heating water heater has priority.

Delivered condition 1
Setting 0 / 1

7B02 Dual-mode temperature of external heat sources

"Dual-mode temperature 7B02"

Outside temperature limit for operating the external heat source.
If the average outside temperature is lower than the set limit temperature over a longer period (**"Dual-mode temperature"**), the external heat source is switched on.
Requirement: The heat pump and/or other heat sources cannot meet the current heat demand on their own.

Above the dual-mode temperature, the heat pump control unit only starts the external heat source if, for example, a heat pump fault is present.

Delivered condition	100 (≙ 10 °C)
Setting	–500 to +500 (≙ –50 to +50 °C)

7B0D External heat source for DHW

"External heat source for DHW 7B0D"

Using the external heat source for DHW heating.
If the heat demand of the DHW cylinder cannot be covered by the heat pump, the circulation pump for DHW reheating and the external heat source will be activated.

Value	Explanation
"0"	External heat source is blocked for DHW heating.
"1"	External heat source is enabled for DHW heating.

Delivered condition	0
Setting	0 / 1

Parameter group DHW

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"DHW"**
4. Select parameter.

6000 Set cylinder temperature

"Cylinder temperature DHW 6000"

DHW cylinder set temperature for DHW heating.

 Operating instructions

Note
*If the heat pump alone cannot achieve the set DHW temperature, an instantaneous heating water heater (on site) is started (if enabled via parameter **"DHW with e heating 6015"**).*

Delivered condition	500 (≙ 50 °C)
Setting range	100 to 700 (≙ 10 to 70 °C)

6015 DHW reheating

"DHW with e heating 6015"

DHW reheating enabled via instantaneous heating water heater (on site).
If the set cylinder temperature cannot be achieved with the heat pump, an instantaneous heating water heater (on site) can be used.

Note
- *The instantaneous heating water heater (on site) has to be enabled separately with parameter **"Inst. heating water heater 7900"**.*
- *Observe setting for **"Booster heater hysteresis 6008"**.*

Value	Explanation
"0"	Instantaneous heating water heater (on site) is not enabled for DHW reheating.
"1"	Instantaneous heating water heater (on site) is connected and enabled for DHW reheating.

Delivered condition	1
Setting	0 / 1

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6005 Minimum temperature for DHW cylinder

"Minimum temperature 6005"

Lower set temperature for DHW cylinder (minimum temperature).
When the actual temperature falls below the minimum temperature selected, the DHW cylinder is heated up to that value plus hysteresis (frost protection). This is independent of the selected operating programme.

Temperature capture is carried out via the temperature sensor integrated into the top of the DHW cylinder.

Delivered condition	100 (≙ 10 °C)
Setting range	50 to 600 (≙ 5 to 60 °C)

6006 Maximum temperature for DHW cylinder

"Maximum temperature 6006"

Upper temperature limit for DHW cylinders.
When this temperature has been reached, the DHW cylinder is not reheated until the temperature has dropped by at least 5 K.

Delivered condition	600 (≙ 60 °C)
Setting range	200 to 800 (≙ 20 to 80 °C)

Danger
Risk of scalding with DHW at **temperatures above 60 ºC**.
To limit the temperature to 60 °C, install a mixing device, e.g. an automatic thermostatic mixing valve (DHW cylinder accessory).

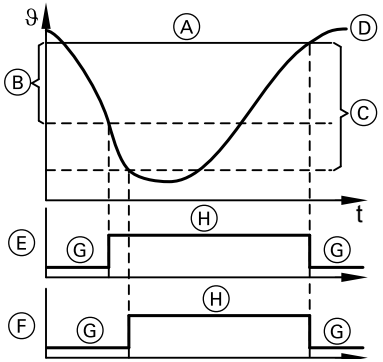
6007/6008 DHW/booster heater hysteresis

"DHW hysteresis 6007"
"Booster heater hysteresis 6008"

Cylinder temperature hysteresis for starting and stopping DHW heating.

6007/6008 DHW/booster heater hysteresis (cont.)

The set value determines the deviation from the set DHW cylinder temperature (**"Cylinder temperature DHW 6000"**) at which DHW heating is started and stopped. Parameter **"DHW hysteresis 6007"** relates to DHW heating with the heat pump. Parameter **"Booster heater hysteresis 6008"** specifies the hysteresis for heating with the instantaneous heating water heater (on site).



Ⓐ Set DHW temperature
Ⓑ Heat pump hysteresis (**"DHW hysteresis 6007"**)
Ⓒ Booster heater hysteresis (**"Booster heater hysteresis 6008"**)
Ⓓ Actual DHW temperature at the top cylinder temperature sensor
Ⓔ Heat pump switching state
Ⓕ Booster heater switching state
Ⓖ OFF
Ⓗ ON

Note

- *The value selected for **"DHW hysteresis 6007"** should be higher than the expected temperature drop due to heat losses during reduced heating mode (approx. 5 K).*
- *A lower value for **"Booster heater hysteresis 6008"** increases the proportion of DHW heating with the booster heater.*
- *Observe setting for **"DHW with e heating 6015"**.*

	"DHW hysteresis 6007"	**"Booster heater hysteresis 6008"**
Delivered condition	70 (≙ 7 K)	100 (≙ 10 K)
Setting range	10 to 100 (≙ 1 to 10 K)	20 to 700 (≙ 2 to 70 K)

6009 DHW start optimisation

"Start optimisation 6009"

Comfort function for DHW cylinder heating.

Operating instructions

6009 DHW start optimisation (cont.)

Delivered condition	0
Setting range	0 / 1

600A DHW stop optimisation

"Stop optimisation 600A"

Comfort function for DHW cylinder heating.

Delivered condition	0
Setting range	0 / 1


Operating instructions

600C Set DHW temperature 2

"Set temperature 2 600C"

Set temperature for auxiliary DHW heat-up function to kill bacteria.

Delivered condition	600 (≙ 60 °C)
Setting range	100 to 700 (≙ 10 to 70 °C)


Operating instructions

600E Temperature sensor 2

"Temperature sensor 2 600E"

No function.

6016 DHW heating priority

"Combi cylinder 6016"

Only when using heating water buffer cylinders with integral DHW heating:

6016 DHW heating priority (cont.)

To shorten the heat-up time, heating circuit heating can be interrupted during DHW heating. For this, the heating circuit pumps of all heating circuits are switched off.

Delivered condition	0
Setting	0 / 1

Value	Explanation
"0"	Simultaneous central heating and DHW heating is possible.
"1"	No central heating during DHW heating, all heating circuit pumps are switched off during this time.

6017 DHW at control high pressure

"No. of attempts DHW 6017"

High set cylinder temperatures can result in shutdowns through controlled high pressure. Upon demand, the control unit tries to restart DHW heating. This parameter determines the number of start attempts.

Delivered condition	1
Setting range	0 to 10

Note
DHW heating that is blocked is automatically enabled again when the operating status changes over for heating the DHW cylinder from a lower to a higher temperature level, for example from ***"Top"*** *to* ***"Normal"*** *(see the operating instructions for further details regarding the operating status).*

6020 Cylinder primary pump operating mode

"Cylinder primary pump type 6020"

6020 Cylinder primary pump operating mode (cont.)

Cylinder primary pump operating mode.

Delivered condition 0
Do not adjust.

Parameter group solar

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Solar"**
4. Select parameter.

7A00 Solar control unit

"Solar control unit type 7A00"

For adjusting the solar control unit used.

Value	Explanation
"0"	There is no solar control unit.
"1"	Vitosolic 100
"2"	Vitosolic 200
"3"	No function
"4"	No function

Delivered condition 0
Setting range 0 to 4

Parameter group electric heater

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Electric heater"**
4. Select parameter.

7900 Instantaneous heating water heater (on site)

"Inst. heating. water heater 7900"

If an instantaneous heating water heater (on site) is installed in the heating water flow, it must be enabled. It can be enabled either for DHW reheating only and/or for heating mode.

Parameter	**Enabling the instantaneous heating water heater for**	
	Heating mode	**DHW reheating**
"Inst. heating. water heater 7900"	**"1"**	**"1"**
"Heating with electro 7902"	**"1"**	**"0"**
"DHW with e heating 6015"	**"0"**	**"1"**

Delivered condition	0
Setting	0 / 1

! **Please note**
Setting "**0**" in parameter **"Inst. heating water heater 7900"** switches the instantaneous heating water heater completely OFF, so that it is also unavailable for heating to provide frost protection.
For the instantaneous heating water heater to be able to start in case of a heat demand for frost protection, set parameter "**Heating with electro** 7902" to **"0"** to shut down, but set **"Inst. heating water heater 7900"** to **"1"**.

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7902 Heating mode with booster heater

"Heating with electro 7902"

Enabling heating mode with the instantaneous heating water heater (on site). If the set flow temperature cannot be achieved with the heat pump, an on-site instantaneous heating water heater can be started for the heating operation.

Note
The instantaneous heating water heater (on site) has to be enabled separately with parameter ***"Inst. heating water heater 7900"****.*

Value	Explanation
"0"	Instantaneous heating water heater (on site) is disabled for heating mode.
"1"	Instantaneous heating water heater (on site) is connected and enabled for heating mode.

Delivered condition 1
Setting 0 / 1

7907 Max. stage instantaneous heating water heater

"Maximum stage, electric heating 7907"

Max. output stage of the instantaneous heating water heater for DHW heating or heating mode.
The selected stage and all those below it will be enabled.

Delivered condition 3
Setting range 1 to 3

Value	Explanation
"1"	Output stage 1, e.g. 3 kW
"2"	Output stage 2, e.g. 6 kW
"3"	Output stage 3 (stages 1 and 2 simultaneously), e.g. 9 kW

790A Stage at power-OFF

"Stage at power-OFF 790A"

Maximum output stage of the instantaneous heating water heater (accessory) during the power-OFF.

The selected stage and all those below it will be enabled.

790A Stage at power-OFF (cont.)

Value	Explanation
"0"	Instantaneous heating water heater remains off during power-OFF, except for frost protection.
"1"	Output stage 1, e.g. 3 kW
"2"	Output stage 2, e.g. 6 kW
"3"	Output stage 3, or subject to type and power connection, stages 1 and 2 simultaneously, e.g. 9 kW

Delivered condition	0
Setting range	0 to 3

790B Dual-mode temperature instantaneous heating water heater

"Dual mode temperature, electric heater 790B"

Temperature limit for heating with the instantaneous heating water heater (on site).
If the long-term average outside temperature falls below the dual-mode temperature, the control unit enables operation of the instantaneous heating water heater. Above the dual-mode temperature, the control unit starts the instantaneous heating water heater only if the heat pump develops a fault.

Delivered condition	100 (≙ 10 °C)
Setting range	–500 to +500 (≙ –50 to +50 °C)

Parameter group internal hydraulics

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Internal hydraulics"**
4. Select parameter.

7300 Heat pump for drying a building

"Heat pump for drying a building 7300"

For drying buildings, the heat pump can be used **in addition** to the instantaneous heating water heater (on site).
If the heat pump is not ready for use (e.g. primary circuit is not yet completed), this function must be set to **"0"** (delivered condition).

Note
- *When using the heat pump to dry a building, observe the loading of the geothermal probe.*
- *Drying buildings with an instantaneous heating water heater (on site) results in high power consumption.*

Value	Explanation
"0"	Heat pump is not used for drying a building.
"1"	Heat pump is used for drying a building.

Delivered condition 0
Setting 0 / 1

7303 Screed program

"Screed program 7303"

Temperature/time profile for screed drying.

Please note
Risk of damage to building through overheating screed with high flow temperatures.
Install a temperature limiter into the flow of the underfloor heating circuit to limit the maximum temperature.

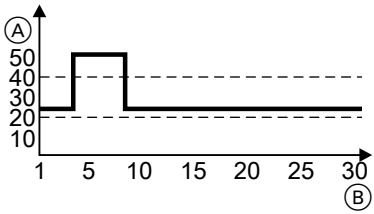
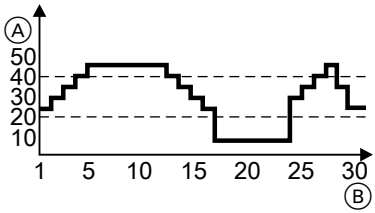
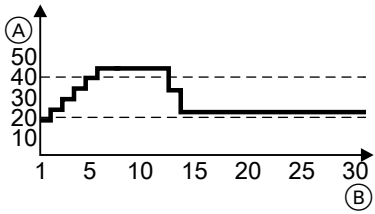
7303 Screed program (cont.)

- The screed programme affects all enabled heating circuits in parallel.
- The selected **"Screed program"** is continued after a power failure or after the control unit has been switched off.
- The selected operating programme continues if the **"Screed program"** has terminated in accordance with the programme or, before its expiry, the temperature/time profile "**0**" is selected.
- The temperature/time profiles 7 to 12 regulate to the maximum flow temperature.
- If the time profile has a higher set flow temperature, the set temperature is limited by parameter **"Maximum flow temperature 200E"** (see page 209) for the heating circuit.
- The power consumption increases when using an instantaneous heating water heater (accessory) for drying buildings.

Note

Observe the specifications of EN 1264-4. The report to be provided by the heating contractor must contain the following heat-up details:

- *Heat-up data with respective flow temperatures*
- *Max. flow temperature achieved*
- *Operating condition and outside temperature during handover*

Value	**Temperature:time profile** Ⓐ **Flow temperature** Ⓑ **Days**
"0"	**No temperature/time profile** Termination of the current profile and operation continued in heating or cooling mode.
"1"	**Temperature/time profile 1 (in acc. with EN 1264-4)** 
"2"	**Temperature/time profile 2 (to ZV parquet and flooring technology)** 
"3"	**Temperature/time profile 3 (to ÖNORM)** 

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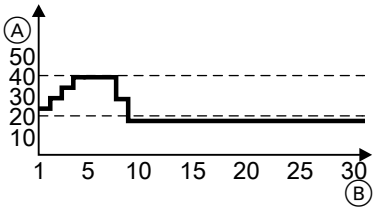
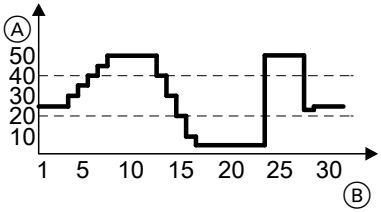
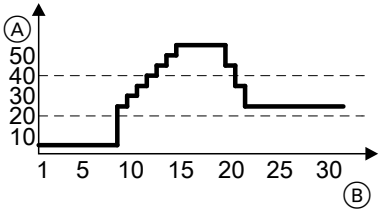
7303 Screed program (cont.)

Value	Temperature:time profile Ⓐ Flow temperature Ⓑ Days
"4"	**Temperature/time profile 4** 
"5"	**Temperature/time profile 5** 
"6"	**Temperature/time profile 6** 

Value	Temperature:time profile Ⓐ Flow temperature Ⓑ Days
"7"	**Fixed value temperature programme** Duration: 5 days
"8"	**Fixed value temperature programme** Duration: 10 days
"9"	**Fixed value temperature programme** Duration: 15 days
"10"	**Fixed value temperature programme** Duration: 20 days
"11"	**Fixed value temperature programme** Duration: 25 days
"12"	**Fixed value temperature programme** Duration: 30 days

Delivered condition	0
Setting range	0 to 12

730D 3-way diverter valve mode

"Heating/DHW diverter valve 730D"

730D 3-way diverter valve mode (cont.)

If, on site, only **one** pump and **one** three-way diverter valve are used to switch between DHW heating and central heating mode, parameter **"Heating/DHW diverter valve 730D"** must be changed to "**1**".

Delivered condition	0
Setting	0 / 1

Value	Explanation
"0"	Three-way diverter valve is not installed; DHW is heated via a separate output; secondary pump does not run; circulation pump for cylinder heating (heating water side) is started.
"1"	Three-way diverter valve is installed; secondary pump also runs for DHW heating.

730C Set flow temperature, external demand

"Set flow temperature, external demand 730C"

Set flow temperature in case of external demand, e.g. from the swimming pool (see page 182).
In contrast to room temperature-dependent or weather-compensated set flow temperatures, a fixed set flow temperature is selected here, for example for heating circuits.

Delivered condition	500 (≙ 50 °C)
Setting range	0 to 700 (≙ 0 to 70 °C)

7320 Primary pump operating mode

"Primary source type 7320"

Primary pump operating mode.

Delivered condition	0 Do not adjust.

7340 Secondary pump operating mode

"Secondary pump type 7340"

Secondary pump operating mode.

Delivered condition	0 Do not adjust.

Parameter group heating water buffer cylinder

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Buffer cylinder"**
4. Select parameter.

7200 Heating water buffer cylinder

"Buffer cylinder 7200"

This function is **only available for system schemes 1 and 2**. The heating water buffer cylinder is optional for system schemes 1 and 2; system schemes 3 to 10 require the heating water buffer cylinder, which is preset.

Value	Explanation
"0"	Heating water buffer cylinder not installed
"1"	Heating water buffer cylinder installed

Delivered condition	0
Setting	0 / 1

7202 Set temperature for "Fixed val."

"Fixed temperature 7202"

Set temperature for "Fixed val." operating status of the heating water buffer cylinder.

Note
The temperature cannot be set higher than the max. temperature in the heating water buffer cylinder (see page 205).

Delivered condition	500 (≙ 50 °C)
Setting range	10 to 700 (≙ 1 to 70 °C)

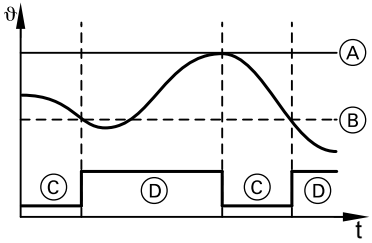
7203 Hysteresis

"Hysteresis, buffer cylinder heating 7203"

7203 Hysteresis (cont.)

The set value determines the deviation from the set temperature of the heating water buffer cylinder (subject to the operating status) at which heating is started and stopped.

Note
*For **system schemes 1 and 2**, this function is only available if option **"1"** was selected under **"Buffer cylinder 7200"**.*



Ⓐ Set temperature
Ⓑ Start hysteresis
Ⓒ Heating the heating water buffer cylinder "OFF"
Ⓓ Heating the heating water buffer cylinder "ON"

Delivered condition	50 (≙ 5 K)
Setting range	20 to 200 (≙ 2 to 20 K)

7204 Maximum temperature

"Maximum temperature 7204"

Upper temperature limit for the heating water buffer cylinder.
Heating of the heating water buffer cylinder ends when this temperature is reached.

Note
- *For **system schemes 1 and 2**, this function is only available if option **"1"** was selected under **"Buffer cylinder 7200"**.*
- *If the value specified here is below the maximum possible set flow temperature of one of the connected heating circuits, this heating circuit may not be able to be supplied with the calculated flow temperature when there is a greater heat demand.*

7204 Maximum temperature (cont.)

Delivered condition	600 (≙ 60 °C)
Setting range	10 to 700 (≙ 1 to 70 °C)

7208 Dual-mode temperature, heating water buffer cylinder

"Temperature block fixed value mode buffer cylinder 7208"

Temperature limit for the **"Fixed val."** operating status with heating water buffer cylinder (see the operating instructions for further details regarding the operating status).
If the long-term average outside temperature exceeds the dual mode temperature, the control unit blocks the operation of the heating water buffer cylinder in operating mode **"Fixed val."** (e.g. in summer). The heating water buffer cylinder will then only be heated to the set temperature for operating status **"Normal"**.
If the long-term average outside temperature falls below the dual mode temperature by 0.5 K (hysteresis), operation of the heating water buffer cylinder in operating mode **"Fixed val."** is automatically continued.

Delivered condition	100 (≙ 10 °C)
Setting range	–500 to +500 (≙ –50 to +50 °C)

Parameter group heating circuits

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Heating circuit 1"**
   or
   "Heating circuit 2"
   or
   "Heating circuit 3"
   or
   "Separate cooling circuit"
4. Select parameter.

Note
The parameters in the parameter groups Heating circuit 1, Heating circuit 2 and Heating circuit 3 are identical.

The assignment to the heating circuit is determined by the first digit of the parameter code:
2xxx for heating circuit 1
3xxx for heating circuit 2
4xxx for heating circuit 3

2000/2001/2022 Room temperatures and switching times

"Standard room temperature 2000"
"Reduced room temperature 2001"
"Party temperature 2022"

Adjusting the set room temperatures and time programmes for all heating circuits (A1, M2 and M3).


Operating instructions

	"Standard room temperature 2000" "Party temperature 2022"	**"Reduced room temperature 2001"**
Delivered condition	200 (≙ 20 °C)	160 (≙ 16 °C)
Setting range	100 to 300 (≙ 10 to 30 °C)	100 to 300 (≙ 10 to 30 °C)

2003 Enabling the remote control

"Remote control 2003"

2003 Enabling the remote control (cont.)

A Vitotrol 200 remote control unit can be used for each heating circuit.


Vitotrol 200 installation instructions

Value	Explanation
"0"	Remote control is not enabled.
"1"	Vitotrol 200 remote control for the heating circuit is installed and enabled.

Note
*Remote control units have no function when the heat pump is set to **"Manual mode"**.*

Delivered condition	0
Setting	0 / 1

2006/2007 Heating curve slope/level

"Heating curve slope 2006"
"Heating curve level 2007"

Heating curve level and slope for all heating circuits (A1, M2 and M3).


Operating instructions

Note
The values determined from the heating curves for the flow temperature are transferred directly as set values for heating circuits with mixers (M2, M3). The set flow temperatures for the direct heating circuit (A1) are always around 8 K higher than the values from the heating curve.

	"Heating curve level 2007"	**"Heating curve slope 2006"**
Delivered condition	0 (≙ 0 K)	6 (≙ 0.6)
Setting range	–150 to +400 (≙ –15 to + 40 K)	0 to 35 (≙ 0 to 3.5)

200A Influence of room temperature hook-up

"Slope room hook-up 200A"

200A Influence of room temperature hook-up (cont.)

The influence of room temperature hook-up can be selected, subject to a room temperature sensor being installed and room temperature hook-up being enabled (see page 209).
The higher the value, the greater the influence of the room temperature on the set flow temperature of the relevant heating circuit with weather-compensated control.

Delivered condition	10
Setting range	0 to 50

200B Room temperature hook-up (heating circuits)

"Room temperature hook-up 200B"

This parameter determines the conditions under which the set flow temperature with weather-compensated control should be corrected by the room influence.

Value	Explanation
"0"	Weather-compensated control without room influence. Set flow temperature is not corrected.
"1"	Weather-compensated control with room influence only for **"Reduc."** operating status.
"2"	Weather-compensated control with room influence only for **"Normal"** operating status.
"3"	Weather-compensated control with room influence for **"Reduc."** and **"Normal"** operating statuses.

Delivered condition	3
Setting range	0 to 3

200E Maximum set flow temperature

"Maximum flow temperature 200E"

Maximum permissible set flow temperature for a heating circuit.

200E Maximum set flow temperature (cont.)

The set flow temperature, which is calculated from the outside temperature and the heating curve, is limited by this parameter to a maximum set flow temperature. For the heating circuit without mixer (A1), limited modulation properties mean the heat pump regulates to the return temperature. The set return temperature is calculated from the set flow temperature minus 5 K.

Note
Since the control unit only limits the set value with this parameter, always install an on-site temperature limiter in the flow of an underfloor heating circuit, to restrict the maximum temperature.

Delivered condition	400 (≙ 40 °C)
Setting range	100 to 700 (≙ 10 to 70 °C)

Parameter group cooling

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Cooling"**
4. Select parameter.

7100 Cooling mode

"Cooling 7100"

Type of cooling mode. Cooling results either through a heating/cooling circuit or via a separate cooling circuit.

Delivered condition 0
Setting range 0 to 3

Value	Explanation
"0"	No cooling.
"1"	"Natural Cooling" Direct transfer of the cooling capacity from the primary circuit, heat pump **stopped**.
"2"	"Natural Cooling" Direct transfer of the cooling capacity from the primary circuit via a mixer, heat pump **stopped**.
"3"	"Active cooling" Transfer of the cooling capacity via the heat pump, heat pump **in** operation, resulting in high cooling capacity. ***Note*** *Since the compressor runs for active cooling, this function must be enabled by the system user (see operating instructions).*

7101 Cooling circuit

"Cooling circuit 7101"

This parameter specifies whether cooling occurs in one of the heating circuits or in a separate cooling circuit.

Value	Explanation
"1"	Cooling on heating circuit A1
"2"	Cooling on heating circuit M2
"3"	Cooling on heating circuit M3
"4"	Cooling a separate cooling circuit

Note
Cooling mode is not possible for several heating or cooling circuits simultaneously.

Delivered condition	1
Setting range	1 to 4

7102 Room temperature separate cooling circuit

"Room temperature 7102"

With this parameter a different set room temperature than for the heating circuits can be specified for the separate cooling circuit. This makes it possible, for example, to also cool a storage room in winter, independent of the set room temperature.


Operating instructions

Delivered condition	200 (≙ 20 °C)
Setting range	100 to 300 (≙ 10 to 30 °C)

7103 Minimum flow temperature for separate cooling circuit

"Minimum flow temperature 7103"

If a lower set flow temperature than the value specified here results due to outside and room temperatures according to the cooling curve, the flow temperature is regulated to this value.

Note
Only the set flow temperature is limited with this value, not the actual temperature.
The minimum permissible set flow temperature specified here applies both for cooling a heating circuit as well as for cooling a separate cooling circuit.

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7103 Minimum flow temperature for separate… (cont.)

Delivered condition	100 (≙ 10 °C)
Setting range	10 to 300 (≙ 1 to 30 °C)

7104 Room hook-up cooling circuit

"Slope room hook-up 7104"

The influence of room temperature hook-up can be selected, subject to a room temperature sensor being installed. The higher the value, the greater the influence of the room temperature on the set flow temperature of the cooling circuit in weather-compensated cooling mode.

Delivered condition	0
Setting range	0 to 50

7110/7111 Cooling curve (cooling circuit/separate cooling circuit)

"Cooling curve level 7110"
"Cooling curve slope 7111"

If the room temperature does not meet the set value for a prolonged period, the cooling characteristics can be matched to the individual ambient conditions. This is achieved by changing the slope and level of the cooling curve for weather-compensated cooling mode.

Observe the modified cooling characteristics over several days (if possible, await a significant change in the weather) before making further adjustments.

	"Cooling curve level 7110"	**"Cooling curve slope 7111"**
Delivered condition	0 (≙ 0 K)	12 (≙ 1.2)
Setting range	–150 to +400 (≙ –15 to + 40 K)	0 to 35 (≙ 0 to 3.5)

Parameter group time

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Time"**
4. Select parameter.

7C00 - 7C06 Summertime/wintertime

In the delivered condition, the changeover will always take place in the night from Saturday to Sunday on the last weekend in March and October. This setting can be changed with parameters **"Summertime - month"**, **"Summertime - week"**, **"Summertime - day"**, **"Wintertime - month"**, **"Wintertime - week"**, and **"Wintertime - day"**.

Parameter	Parameter code	Delivered condition	Setting range	
"Automatic summer/wintertime changeover"	**"7C00"**	**"1"**	**"1"** **"0"**	Automatic changeover enabled. Automatic changeover not enabled.
"Summertime - month"	**"7C01"**	**"3"**	**"1"** to **"12"**	January to December
"Summertime - week"	**"7C02"**	**"5"**	**"1"** to **"5"**	First to last week of the month
"Summertime - day"	**"7C03"**	**"7"**	**"1"** to **"7"**	Monday to Sunday
"Wintertime - month"	**"7C04"**	**"10"**	**"1"** to **"12"**	January to December
"Wintertime - week"	**"7C05"**	**"5"**	**"1"** to **"5"**	First to last week of the month
"Wintertime - day"	**"7C06"**	**"7"**	**"1"** to **"7"**	Monday to Sunday

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Parameter group communication

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Communication"**
4. Select parameter.

7710 LON communication module

"LON module installed 7710"

If LON communication module is installed in the control unit.

Delivered condition	0
Setting	0 / 1

Value	Explanation
"0"	LON communication module is not enabled.
"1"	LON communication module is installed and enabled.

7798/7777 LON system number/subscriber number

"System number 7798"
"Subscriber number 7777"

Range of numbers in LON addresses. The addresses of LON subscribers consist of three different parts, as in a telephone network (country code, area code, subscriber number). The first part is permanently set to the same value for all Viessmann appliances. The other parts comprise system and subscriber number. This enables subscribers to be grouped according to system number, for example to separate the external heat source in the LON as well.

Note
To avoid communication conflicts, every subscriber number within a system may only be assigned once. The Vitocom communication interface always has subscriber number 99.

7798/7777 LON system number/subscriber number (cont.)

	"Subscriber number"	"System number"
Delivered condition	1	1
Setting range	1 to 99	1 to 5

7779 Fault manager

"Fault manager 7779"

Device is fault manager within a system.
This parameter determines whether the device should collect and display all system fault messages. Furthermore, the control unit monitors all subscribers for failure and generates central fault messages.

Note
Only one device may be configured as the fault manager within a system. Exception: The Vitocom communication interface may be an additional fault manager.

Value	Explanation
"0"	Device is not fault manager.
"1"	Device is fault manager.

Delivered condition 0
Setting 0 / 1

779C Receive interval for data

"Receive heartbeat 779C"

Receive interval for the values and messages transmitted via LON.
If no signal is received for a size or message within this cycle time, the control unit sets this value or status to an internal preset until the corresponding value is received again.

Delivered condition 20 min
Setting range 0 to 60 min

7797 Outside temperature via LON

"Outside temperature 7797"

If several subscribers use the current outside temperature value, this can be made available centrally by one device within a system. All other subscribers in the same system can receive the temperature values.

Delivered condition	0
Setting range	0 to 2

Note
Only one subscriber within a system may transmit the outside temperature.

Value	Explanation
"0"	Device captures the outside temperature via the locally connected temperature sensor.
"1"	Device captures outside temperature of another LON subscriber within the same system.
"2"	Device transmits outside temperature. All LON subscribers within the same system can receive these values.

77FF Time via LON

"Time 77FF"

77FF Time via LON (cont.)

This parameter determines the source from which the control unit receives the time and whether it is to be transmitted via LON to other subscribers.

Delivered condition 0
Setting range 0 to 2

Note
Only one subscriber within a system may transmit the time.

Value	Explanation
"0"	Device receives time from the control unit's internal clock
"1"	Device receives time from another LON subscriber within the same system.
"2"	Device transmits the time from the internal clock of the control unit. All LON subscribers within the same system can receive the time signal.

5707 Heat pump numbers in a cascade

"Heat pump number 5707"

Numbers of the heat pumps in a cascade, that are connected via LON. Numbers within a LON must be unique.

Note
Lag heat pumps that are connected via external extension H1 do not need to be numbered.

Delivered condition 1
Setting 1 / 2 / 3 / 4

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Parameter group operation

Service menu:
1. Press **OK** + ☰ simultaneously for approx. 4 s.
2. **"Coding level 1"**
3. **"Control"**
4. Select parameter.

8800 Lock out controls

"Lock out controls 8800"

For locking and enabling the controls.

Value	Explanation
"0"	Enabling operation in the standard menu and in the extended menu.
"1"	Operation in the standard menu and in the extended menu blocked. Only manual operation possible.
"2"	Operation in the standard menu enabled and in the extended menu blocked.

Note
- *Remote control and maintenance in conjunction with the Vitocom is possible with all settings.*
- *Enabling operation via the coding level 1 is also possible in the blocked state (settings **"1"** and **"2"**).*

Delivered condition	0
Setting range	0 to 2

Overview of the PCBs and connection options

General information regarding the electrical connections

For further information see chapter "Electrical connection", page 72.

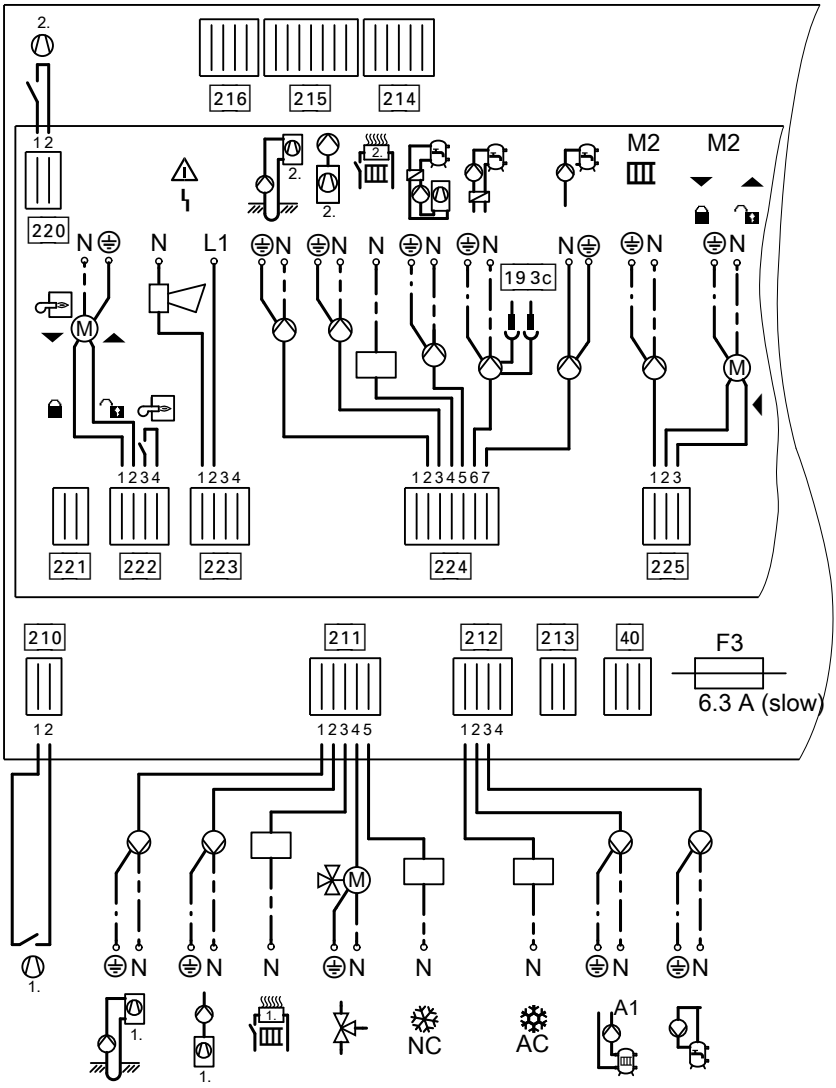
- The total output of all components connected directly to the control unit (e.g. pumps, valves, message facilities, contactors) must not exceed 1000 W. If the total output ≤ 1000 W, the individual rating of a component (e.g. pump, valve, message facility, contactor) can be greater than specified. However, never exceed the breaking capacity of the corresponding relay (see page 241).
- In the delivered condition, terminals may have been pre-allocated (subject to appliance version).
  If two components are connected to the same terminal, press both cores together into a **single** wire ferrule.
- The KM BUS wires are interchangeable.
- The neutral and earth conductors of all components are connected to the terminals X2.N and X1.⏚ of the cross connect PCB.

Note

Only the connections to be made are shown in the following PCB diagrams. Pre-allocated connections made at the factory are explained in the tables.

Overview of the PCBs and connection options (cont.)

Main PCB with extension (operational components 230 V~)



F3	Fuse 6.3 A (slow)	210	Factory connection
40	Factory connection	211/212	On site connections

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Overview of the PCBs and connection options (cont.)

213-216 Factory connections
220-222 Factory connections
223-225 On site connections

Operational components 230 V~

Plug	Terminals	Function	Explanation
40		Power supply PCBs	Factory connection
210	210.1 210.2	Compressor control stage 1 (type BW) via EEV controller (refrigerant circuit control)	■ Heat demand: Contact closed, 210.2 is 'live' ■ If the compressor will not start, check whether it has been enabled by the EEV controller (own relay on EEV PCB) Factory connection
	210.1 210.2	End of safety chain	'Live' in case of fault-free safety chain
211	211.1	Primary pump (heat pump stage 1, type BW or common primary pump), well pump control	■ Max. output: 200 W Connect on site
	211.2	Secondary pump (heat pump stage 1, type BW)	■ In systems without a heating water buffer cylinder, no other heating circuit pump is required (see terminal 212.2) ■ Max. output: 130 W Connect on site
	211.3	Control of instantaneous heating water heater, stage 1	Accessories ■ Output 10 W Connect on site
	211.4	Circulation pump for cylinder heating or three-way diverter valve, heating/DHW heating	■ Max. output: 130 W ■ Voltage: 230 V~ Connect on site
	211.5	NC function control "natural cooling"	■ Max. output: 10 W ■ Voltage: 230 V~ Create circuit on site

Overview of the PCBs and connection options (cont.)

Plug	Terminals	Function	Explanation
212	212.1	AC function control "active cooling"	■ Max. output: 10 W ■ Voltage: 230 V~ Create circuit on site
	212.2	Heating circuit pump for heating circuit without mixer (A1)	■ This pump is installed in addition to the secondary pump if a heating water buffer cylinder is installed. ■ Max. output: 100 W Connect on site
	212.3	DHW circulation pump	■ Max. output: 50 W ■ Voltage: 230 V~ Connect on site
220	220.1 220.2	Compressor control stage 2 (type BWS) via EEV controller (refrigerant circuit control)	■ Heat demand: Contact closed, 220.2 is 'live' ■ If the compressor will not start, check whether it has been enabled by the EEV controller stage 2 (own relay on EEV PCB stage 2) Factory connection
222	222.1	Mixer motor control for external heat source Signal Mixer CLOSED	■ Voltage: 230 V~ Connect on site
	222.2	Mixer motor control for external heat source Signal Mixer OPEN	■ Voltage: 230 V~ Connect on site
	222.3 222.4	External heat source control	Zero volt contact: ■ Contact load 230 V/50 Hz, 4(2) A Connect on site
223	223.1 223.2	Central fault message	Zero volt contact: ■ Closed: Fault ■ Open: No fault ■ Contact load 230 V/50 Hz, 4(2) A ■ Not suitable for safety LV Connect on site

Overview of the PCBs and connection options (cont.)

Plug	Terminals	Function	Explanation
224	224.2	Primary pump for heat pump stage 2 (type BWS)	■ Max. output: 200 W ■ Voltage: 230 V~ Connect on site
	224.3	Secondary pump for heat pump stage 2 (type BWS)	■ Max. output: 130 W ■ Voltage: 230 V~ Connect on site
	224.4	Control of instantaneous heating water heater, stage 2	Accessories ■ Output 10 W Connect on site
	224.5	Circulation pump for cylinder heating (heating water side) for heat pump stage 2 (type BWS)	■ Max. output: 130 W ■ Voltage: 230 V~ Connect on site
	224.6	Cylinder primary pump (DHW side), two-way shut-off valve	Switch cylinder primary pump and two-way shut-off valve in parallel ■ Max. output: 130 W Connect on site
	224.7	Circulation pump for DHW reheating	■ Max. output: 100 W ■ Voltage: 230 V~ Connect on site
225	225.1	Heating circuit pump of the heating circuit with mixer M2	■ Max. output: 100 W Connect on site
	225.2	Mixer motor control, heating circuit with mixer M2 signal CLOSED ▼	■ Voltage: 230 V Connect on site
	225.3	Mixer motor control, heating circuit with mixer M2 signal OPEN ▲	■ Voltage: 230 V Connect on site

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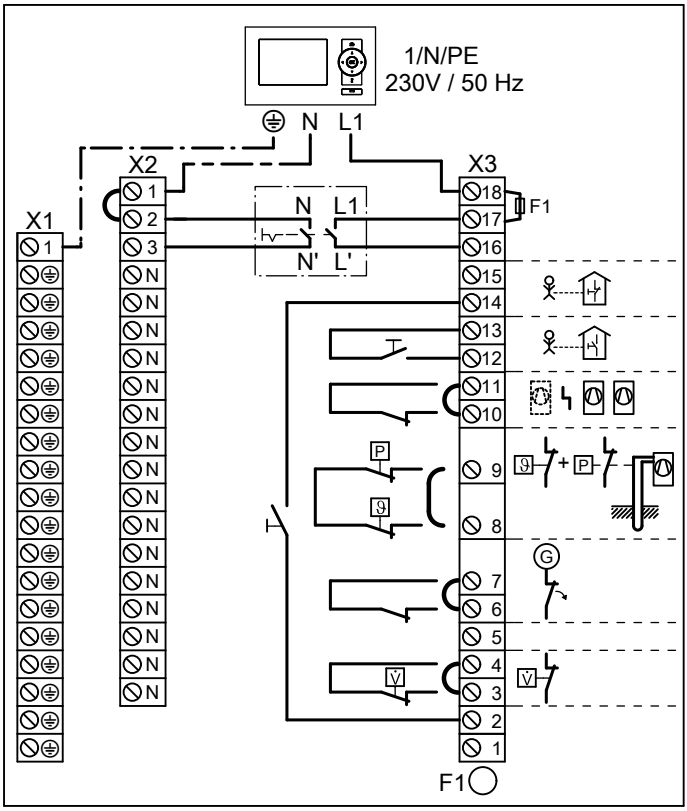
Overview of the PCBs and connection options (cont.)

Cross connect PCB (message and safety connections)



F1 Fuse 6.3 A (slow)
X1 Terminals X1.⏚ for earth conductors of **all** components
X2 Terminals X2.N for neutral conductors of **all** components
X3
- Power supply terminals of the control unit "L1" and auxiliary components
- Switched phase L1: X3.1, X3.2, X3.3, X3.7, X3.11, X3.13
- Terminals for message and safety connections

Overview of the PCBs and connection options (cont.)

Message and safety connections

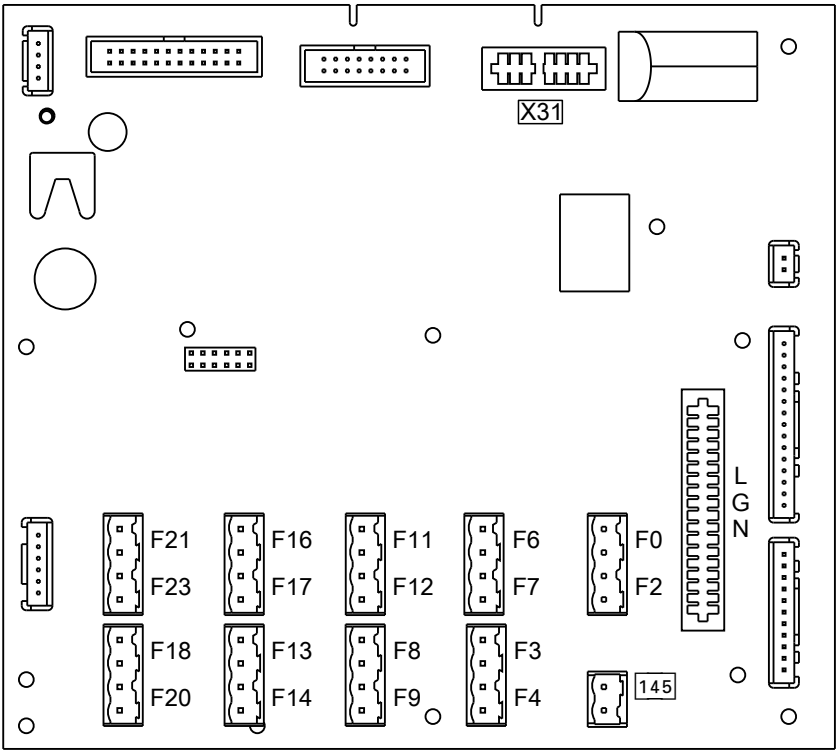
Terminals	Function	Explanation
X3.1	Phase switched	
X3.2 X3.14 or to external extension H1	External blocking, mixer CLOSED	Zero volt contact required: ■ Closed: Blocking enabled ■ Open: No blocking ■ Breaking capacity 230 V~, 2 mA Connect on site
X3.3 X3.4	Flow switch, well circuit	Zero volt contact required: ■ Closed: Heat pump operational ■ Open: Heat pump shut down ■ Breaking capacity 230 V~, 0.15 A Connection on site; remove jumper when connecting
X3.6 X3.7	Power-OFF	Zero volt contact required: ■ Closed: No blocking (safety chain has continuity) ■ Open: Blocking enabled ■ Breaking capacity 230 V~, 0.15 A Connection on site; remove jumper when connecting
X3.8 X3.9	Primary circuit pressure switch and/or frost stat **or** Jumper	Zero volt contact required: ■ Closed: Safety chain has continuity ■ Open: Safety chain interrupted; heat pump shut down ■ Breaking capacity 230 V~, 0.15 A Connect on site: ■ Connected in series if both safety components are installed ■ **Insert jumper if no safety components are installed**
X3.10 X3.11	Fault message, lag heat pump in a cascade **or** Jumper	Zero volt contact required: ■ Closed: No faults ■ Open: Fault ■ Breaking capacity 230 V~, 0.15 A Connection on site; remove jumper when connecting

Overview of the PCBs and connection options (cont.)

Terminals	Function	Explanation
X3.12 X3.13 or to external extension H1	External demand to the heat pump; mixer OPEN; operating status changeover	Zero volt contact required: ■ Closed: Demand ■ Open: No demand ■ Breaking capacity 230 V, 2 mA Connect on site
X2.2 X2.3 X3.16 X3.17	ON/OFF switch	At the programming unit
X3.17 X3.18	Fuse F1 6.3 A (slow)	

Overview of the PCBs and connection options (cont.)

Controller and sensor PCB



F.. Plug for sensor
LON Slot for LON module
"X31" Coding card slot
145 KM BUS

Sensors

Plug	Sensor	Type
F0	Outside temperature sensor Connect on site	Ni 500
F2	Flow temperature sensor, primary circuit Factory connection	Pt 500
F3	Return temperature sensor, primary circuit Factory connection	Pt 500
F4	Buffer temperature sensor above Connect on site	Pt 500

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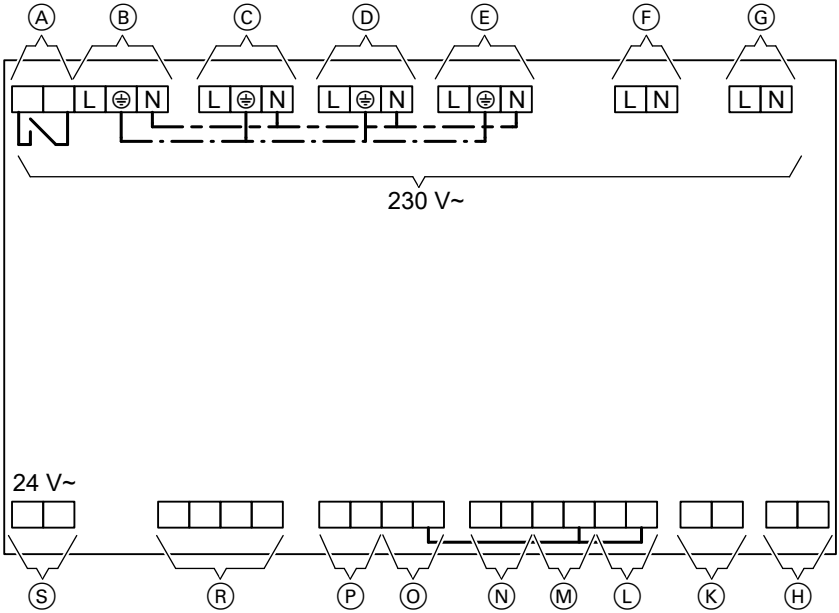
Overview of the PCBs and connection options (cont.)

Plug	Sensor	Type
F6	Cylinder temperature sensor, top Connect on site	Pt 500
F8	Flow temperature sensor, secondary circuit Factory connection	Pt 500
F9	Return temperature sensor, secondary circuit for heat pump stage 1 (type BW) Factory connection	Pt 500
F12	Flow temperature sensor, heating circuit with mixer (M2) Connect on site	Ni 500
F13	System flow temperature sensor (with sensor well, downstream of the heating water buffer cylinder) Connect on site	Pt 500
F14	Flow temperature sensor, cooling circuit (direct heating circuit A1 or separate cooling circuit) Connect on site	Ni 500
F16	Room temperature sensor, separate cooling circuit Connect on site	Ni 500
F18	Return temperature sensor, secondary circuit for heat pump stage 2 (type BWS) Connect on site	Pt 500
F20	Boiler temperature sensor, external heat source Connect on site	Pt 500

Overview of the PCBs and connection options (cont.)

EEV PCB



- Ⓐ Compressor relay
- Ⓑ Mains voltage
- Ⓒ EVI relay
- Ⓓ Defrost
- Ⓔ Modulation compressor
- Ⓕ Manual compressor control (actuator test)
- Ⓖ Defrost control
- Ⓗ KM BUS
- Ⓚ Address jumper, multi-stage system
  - ■ Heat pump stage 1 (type BW): without jumper
  - ■ Heat pump stage 2 (type BWS): with jumper
- Ⓛ LPG temperature sensor
- Ⓜ Hot gas temperature sensor
- Ⓝ Pressure gas temperature sensor
- Ⓞ Suction gas temperature sensor
- Ⓟ Low pressure sensor
- Ⓡ Stepper motor EEV
- Ⓢ Power supply

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Parts list

Information for ordering spare parts. *Quote the part and serial no. (see type plate) and the position no. of the required part (as per this parts list).*

Obtain standard parts from your local supplier.
Ⓐ Type plate

Individual parts for type BW/WW+BWS/WWS

001 Compressor
002 Condenser
003 Evaporator
004 High pressure sensor
005 Low pressure sensor
006 Spacer
007 Electronic expansion valve (EEV)
008 Filter dryer
009 Pressure switch
010 Sight glass
011 Compressor fixing
012 Union nut
013 Schrader valve
014 Sealing cap
015 Line, brine outlet
016 Line, heating water return/DHW cylinder return
017 Line, heating water flow/DHW cylinder flow
018 Refrigerant line, filling
019 Refrigerant line, sight glass, expansion valve
020 Refrigerant line, condenser filter drier
021 Refrigerant line, expansion valve-evaporator
022 Refrigerant line, filter drier-sight glass
023 Refrigerant line, evaporator-compressor
024 Refrigerant line, compressor-condenser
025 Hose DN40 with G1½"
026 Hose DN40 with G1½"
027 Nipple 5243-42a x 22
028 Bend 90°
029 Rubber cushion
030 Anti-vibration mount set
031 Threaded insert 35 x 1½
032 Gasket A ∅ 30 x 44 x 2 mm
033 Temperature sensor Pt 500
034 Safety spring
035 Sensor mount sealed
036 Connecting brace
037 Soldered valve body
038 Adapter nipple
039 Fill/drain valve
040 Heat exchanger holder
041 Base, cooling panel
200 Heat pump module front panel
201 Side panel, left
202 Side panel, right
203 Front top panel
204 Top panel, back
205 Lower panel
206 Back panel
207 Panel strip, front/back
208 Panel strip, right/left
209 Bottom panel
210 Rail
211 Rail, top front/back
212 Rail, top right/left
213 Cover panel, control unit
219 Adjustable foot
220 Decorative cap
725 EEV control
726 Transformer
735 Start-up resistor
743 Three-pole contactor
744 Three-pole contactor (not in type BW/BWS145)

Parts list (cont.)

745 Thermal relay (only in type BW/BWS145)
746 Thermal relay (only in type BW/BWS121)
747 PCBs, terminal box 230 V~ with cable harness
748 Control module
776 Thermal relay (only in type BW/BWS129)
777 Compressor line
778 Cable kit, EEV
779 Cable harness 230 V~
780 Cable harness, pressure switch
781 Cable harness, low voltage
782 Power cable
783 Power supply [terminals]
784 Cable harness, EEV

Other individual parts for type BW/WW

214 Vitocal 300 logo
700 Programming unit
701 PCB CU401 with cover
702 PCB MB761 with cover
703 PCB SA135 with cover
704 Coding card
711 Base carrier CU401
712 Base carrier MB761
727 Programming unit
742 Phase failure relay
754 Connecting cable
755 Ribbon cable
760 Mating plug MB761
761 Mating plug SA135
762 Mating plug CU401
772 Fuse holder
773 Cartridge fuse 6.3 A

Individual parts not shown for type BW/WW+BWS/WWS

112 Cable harness 230 V
121 Control module cable kit
126 Plug-in terminal
131 Cable kit, electronic expansion valve (EEV)
132 Cable harness, high pressure
133 Cable harness, low pressure
134 Connecting cable, electronic expansion valve (EEV)
135 Connecting cable, compressor
137 Cable fittings
139 Earthing cable kit
300 Operating instructions
301 Installation/service instructions
302 Touch-up paint stick, Vitosilver
303 Touch-up spray, Vitosilver
305 Fixing elements
306 Connecting elements

Other individual parts not shown for type BW/WW

103 Ribbon cable, 50-PIN
104 Ribbon cable, 24-PIN
105 Ribbon cable, 26-PIN
110 Fuse holder (6.3 A, slow)
111 Cable harness, low voltage
115 Auxiliary contact
122 Control module for instantaneous heating water heater
123 Line set, instantaneous heating water heater

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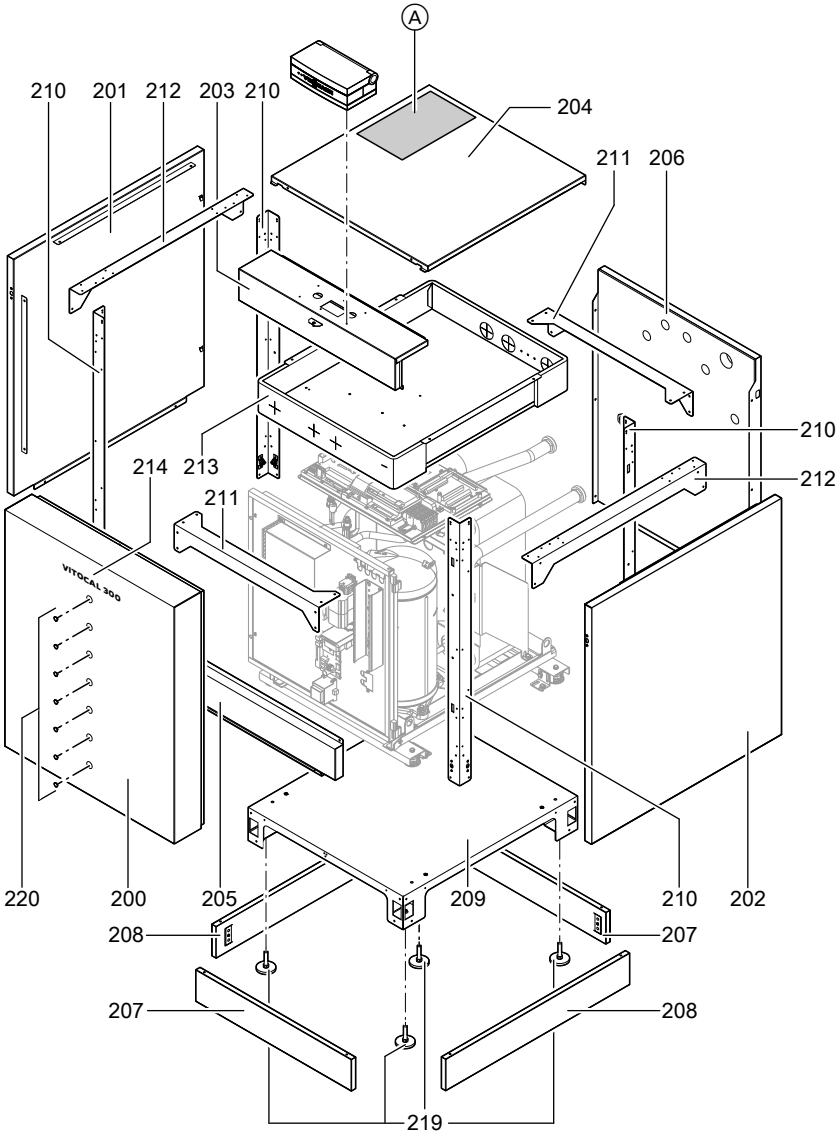
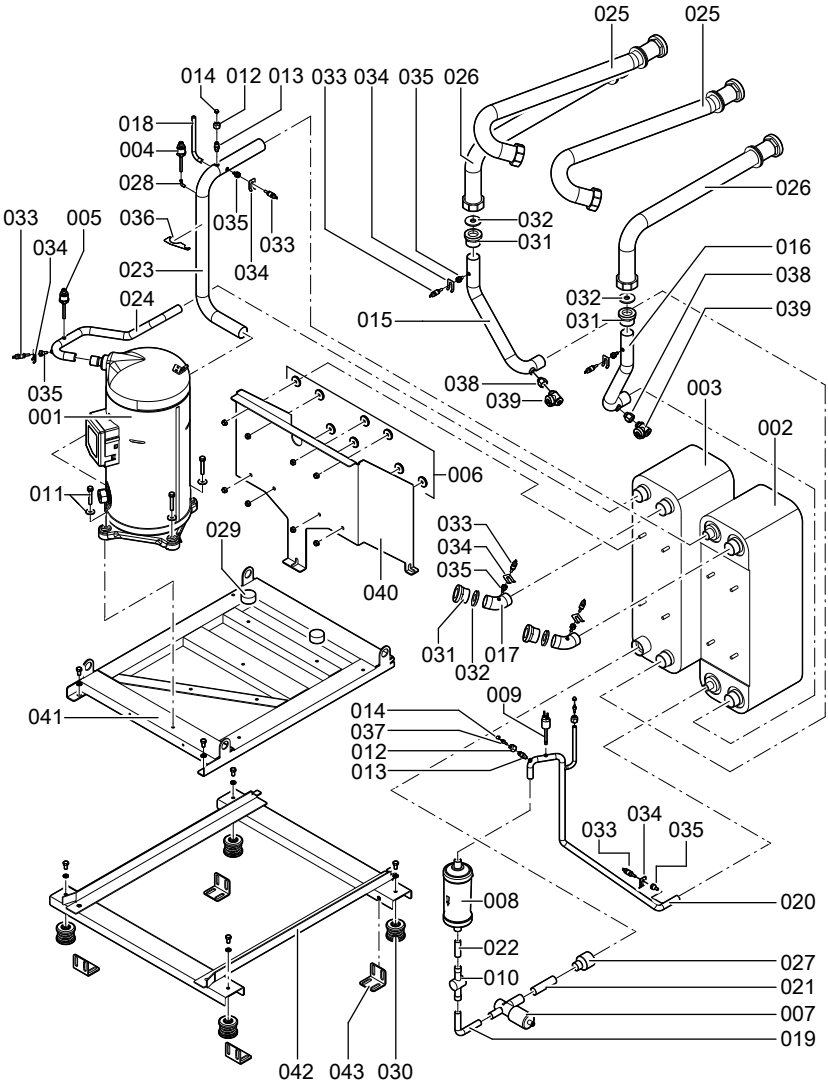
Parts list (cont.)



Parts list (cont.)



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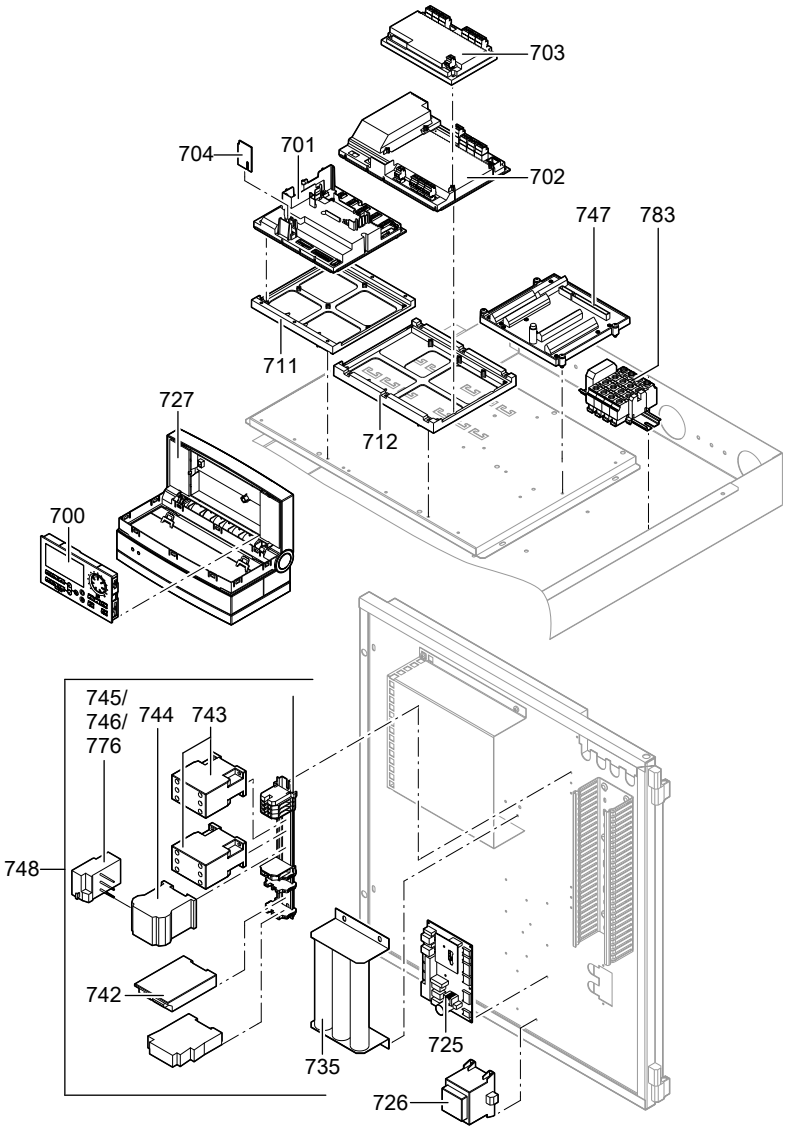
Parts list (cont.)



Hydraulic parameters report

Setting and test values		Set value	Commissioning
Antifreeze (brine medium)	°C	– 15	
Testing the external heating circuit pumps			
Circulation pump type			
Circulation pump stage			
Overflow valve setting			
Primary circuit commissioning			
Primary circuit flow temperature	°C		
Primary circuit return temperature	°C		
Temperature differential ΔT:			
Secondary circuit flow temperature = 35 °C at primary circuit flow temperature = 10 °C	K	3 to 5	
Secondary circuit flow temperature = 35 °C at primary circuit flow temperature = 0 °C	K	2 to 4	
Testing the mixer, heat pump and cylinder heating			
Checked under the following conditions:			
Room temperature	°C		
Outside air temperature	°C		
"**DHW cylinder top**" temperature constant?		Yes (±1 K)	
Secondary circuit flow temperature	°C	rising	from to
Temperature differential ΔT "**Secondary flow**" / "**Secondary return**"		6 to 8 K	

Control parameters report

For a description of parameters, see from page 173.

Control parameters report (cont.)

Parameter	Code	Delivered condition	Commissioning
System definition			
System scheme	7000	2	
Language	7001	English	
Temperature differential heating	7003	40 (≙ 4 K)	
Temperature differential cooling	7004	40 (≙ 4 K)	
External extension	7010	0	
Swimming pool	7008	0	
Cascade control	700A	0	
No. of external heat pumps	5735	0	
Output lag heat pump	700B	10	
Changing the heating circuit operating mode	7011	0	
Effect of operating mode changeover	7012	2	
External blocking effect	701A	0	
Duration of operating mode changeover	7013	8 h	
External demand mixer "OPEN"	7014	4	
External blocking mixer "CLOSED"	7015	4	
Vitocom 100	7017	0	
Common system sensor	701B	1	
Compressor			
Enable	5000	1	
Output compressor stage	5030	Rated heating output according to type plate for heat pump stage 1 (type BW)	
Compressor 2			
Enable	5100	1	
Output compressor stage 2	5130	Rated heating output according to type plate for heat pump stage 2 (type BWS)	
Ext. heat source			
External heat source	7B00	0	
Priority	7B01	1	
Dual-mode temperature	7B02	100 (≙ 10 °C)	
External heat source for DHW	7B0D	0	

Control parameters report (cont.)

Parameter	Code	Delivered condition	Commissioning
DHW			
Cylinder temperature DHW	6000	500 (≙ 50 °C)	
DHW with e heating	6015	1	
Minimum temperature	6005	100 (≙ 10 °C)	
Maximum temperature	6006	600 (≙ 60 °C)	
DHW hysteresis	6007	70 (≙ 7 K)	
Booster heater hysteresis	6008	100 (≙ 10 K)	
Start optimisation	6009	0	
Stop optimisation	600A	0	
Set temperature 2	600C	600 (≙ 60 °C)	
Temperature sensor 2	600E	No function	
Combi cylinder	6016	0	
No. of attempts DHW	6017	1	
Cylinder primary pump type	6020	Do not adjust.	
Solar			
Solar control unit type	7A00	0	
Electric heater			
Inst. heating water heater	7900	0	
Heating with electro	7902	1	
Maximum stage, electric heating	7907	3	
Stage at power-OFF	790A	0	
Dual-mode temperature, electric heating	790B	100 (≙ 10 °C)	
Internal hydraulics			
Heat pump for drying a building	7300	0	
Screed program	7303	0	
Heating/DHW diverter valve	730D	0	
Set flow temperature, external demand	730C	500 (≙ 50 °C)	
Primary source type	7320	Do not adjust.	
Secondary pump type	7340	Do not adjust.	
Heating water buffer cylinder			
Buffer cylinder	7200	0	
Fixed temperature	7202	500 (≙ 50 °C)	
Hysteresis, buffer cylinder heating	7203	50 (≙ 5 K)	
Maximum temperature	7204	600 (≙ 60 °C)	
Buffer cylinder fixed value mode temperature limiter	7208	100 (≙ 10 °C)	

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Control parameters report (cont.)

Parameter	Code	Delivered condition	Commissioning
Heating circuit 1			
Standard room temperature	2000	200 (≙ 20 °C)	
Reduced room temperature	2001	160 (≙ 16 °C)	
Party temperature	2022	200 (≙ 20 °C)	
Remote control	2003	0	
Heating curve slope	2006	6 (≙ 0.6)	
Heating curve level	2007	0 (≙ 0 K)	
Slope room hook-up	200A	10	
Room temperature hook-up	200B	3	
Maximum flow temperature	200E	400 (≙ 40 °C)	
Heating circuit 2			
Standard room temperature	3000	200 (≙ 20 °C)	
Party temperature	3022	200 (≙ 20 °C)	
Reduced room temperature	3001	160 (≙ 16 °C)	
Remote control	3003	0	
Heating curve slope	3006	6 (≙ 0.6)	
Heating curve level	3007	0 (≙ 0 K)	
Slope room hook-up	300A	10	
Room temperature hook-up	300B	3	
Maximum flow temperature	300E	400 (≙ 40 °C)	
Heating circuit 3			
Standard room temperature	4000	200 (≙ 20 °C)	
Reduced room temperature	4001	160 (≙ 16 °C)	
Party temperature	4022	200 (≙ 20 °C)	
Remote control	4003	0	
Heating curve slope	4006	6 (≙ 0.6)	
Heating curve level	4007	0 (≙ 0 K)	
Slope room hook-up	400A	10	
Room temperature hook-up	400B	3	
Maximum flow temperature	400E	400 (≙ 40 °C)	
Cooling			
Cooling	7100	0	
Cooling circuit	7101	1	
Room temperature	7102	200 (≙ 20 °C)	
Minimum flow temperature	7103	100 (≙ 10 °C)	
Slope room hook-up	7104	0	
Cooling curve slope	7110	12 (≙1.2)	

Control parameters report (cont.)

Parameter	Code	Delivered condition	Commissioning
Cooling curve level	7111	0 (≙ 0 K)	
Time			
Automatic summer/wintertime changeover	7C00	1	
Summertime - month	7C01	3	
Summertime - week	7C02	5	
Summertime - day	7C03	7	
Wintertime - month	7C04	10	
Wintertime - week	7C05	5	
Wintertime - day	7C06	7	
Communication			
LON module installed	7710	0	
System number	7798	1	
Subscriber number	7777	1	
Fault manager	7779	0	
Receive heartbeat	779C	20 min	
Outside temperature	7797	0	
Time	77FF	0	
Heat pump number	5707	1	
Control			
Lock out controls	8800	0	

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Specification

Note

- *The output given is the recommended connected load.*
- *The total output of all connected appliances must not exceed 1000 W. If the total output ≤ 1000 W, the individual rating of a component can be greater than specified.*
- *The stated current indicates the max. switching current of the switching contact (observe the total current of 5 A).*
- *Controls for external heat source and central fault message are unsuitable for safety LV.*

Connection values of the function components

Components	Connection	Connected load [W]	Voltage [V]	Max. switching current [A]
Primary pump (type BW/WW) / well pump	211.1	200	230	4(2)
Secondary pump	211.2	130	230	4(2)
Instantaneous heating water heater control, stage 1	211.3	10	230	4(2)
Circulation pump for cylinder heating (on the heating water side) or three-way diverter valve, heating/DHW heating	211.4	130	230	4(2)
NC signal control "natural cooling"	211.5	10	230	4(2)
Circulation pump, separate cooling circuit and AC signal control "active cooling"	212.1	10	230	4(2)
Heating circuit pump A1	212.2	100	230	4(2)
DHW circulation pump	212.3	50	230	4(2)
External heat source control	222.3 222.4	zero volt contact	250	4(2)
Central fault message	223.1 223.2	zero volt contact	250	4(2)
Primary pump, heat pump stage 2 (type BWS/WWS)	224.2	200	230	4(2)

Specification (cont.)

Components	Connection	Connected load [W]	Voltage [V]	Max. switching current [A]
Secondary pump, heat pump stage 2 (type BWS/WWS)	224.3	130	230	4(2)
Instantaneous heating water heater control, stage 2	224.4	10	230	4(2)
Circulation pump for cylinder heating (on the heating water side) or three-way diverter valve, heating/DHW heating for heat pump stage 2 (type BWS/WWS)	224.5	130	230	4(2)
Cylinder primary pump (DHW side)	224.6	130	230	4(2)
Circulation pump for DHW reheating or Control of immersion heater EHE	224.7	100	230	4(2)
Heating circuit pump M2	225.1	100	230	4(2)
Total current				max. 5(3) A

Type BW/BWS

BW/BWS		121	129	145
Output data to DIN EN 14511 (0/35 °C, 5 K spread)				
Rated output	kW	21.2	28.8	42.8
Refrigerating capacity	kW	17.0	23.3	34.2
Power consumption	kW	4.48	5.96	9.28
Coefficient of performance ∈ (COP)		4.73	4.83	4.6
Output data to DIN EN 255 (0/35 °C, 10 K spread)				
Rated output	kW	21.5	29.2	43.5
Refrigerating capacity	kW	17.5	23.8	35.0
Power consumption	kW	4.33	5.75	9.16
Coefficient of performance ∈ (COP)		4.97	5.08	4.8

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Specification (cont.)

BW/BWS		121	129	145
Brine (primary circuit)				
Capacity	l	7.3	9.1	12.7
Minimum flow rate (always maintain)	l/h	3300	4200	6500
Pressure drop	mbar	90	120	200
Max. flow temperature	°C	25	25	25
Min. flow temperature	°C	–5	–5	–5
Heating water (secondary circuit)				
Capacity	l	7.3	9.1	12.7
Minimum flow rate (always maintain)	l/h	1900	2550	3700
Pressure drop	mbar	30	48	60
Max. flow temperature	°C	60	60	60

Type WW/WWS

WW/WWS		121	129	145
Output data to DIN EN 14511 (10/35 °C, 5 K spread)				
Rated output	kW	28.1	37.1	58.9
Refrigerating capacity	kW	23.7	31.4	48.9
Power consumption	kW	4.73	6.2	10.7
Coefficient of performance ∈ (COP)		5.94	6.0	5.5
Brine (primary circuit)				
Capacity	l	7.3	9.1	12.7
Minimum flow rate at approx. 4 K spread (always maintain)	l/h	5200	7200	10600
Pressure drop	mbar	200	300	440
Max. inlet temperature	°C	25	25	25
Min. inlet temperature	°C	-5	-5	-5
Heating water (secondary circuit)				
Capacity	l	7.3	9.1	12.7
Minimum flow rate (always maintain)	l/h	1900	2550	3700
Pressure drop	mbar	30	48	60
Max. flow temperature	°C	60	60	60

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Specification (cont.)

Type BW/BWS, WW/WWS

BW/BWS, WW/WWS		121	129	145
Rated voltage, compressor, heat pump stage 2 (type BWS/WWS)	V	3/PE 400 V/50 Hz		
Rated current, compressor	A	16	22	34
Starting current, compressor (with starting current limiter)	A	<30	41	47
Starting current, compressor with stalled armature	A	95	118	174
Compressor fuse	A	1xC16A 3-pole	1xC25A 3-pole	1xC40A 3-pole
Rated voltage control unit/electronics	V	1/N/PE 230 V/50 Hz		
Fuse protection, control unit/electronics		1xB16A		
Fuse, control unit/electronics	A	6.3 A (slow) /250 V		
Rated capacity, control unit/electronics	W	1000	1000	1000
Max. electr. power consumption, control unit/electronics, heat pump stage 1 (type BW/WW)	W	25	25	25
Max. electr. power consumption, control unit/electronics, heat pump stage 2 (type BWS/WWS)		20	20	20
Electr. power consumption, control unit/electronics, stages 1 and 2	W	45	45	45
Protection class		I	I	I
IP rating		IP 20	IP 20	IP 20
Refrigerant circuit				
Refrigerant		R 410 A		
Fill volume	kg	6.5	7.3	10.0
Compressor	Type	Hermetically sealed scroll compressor		
Permiss. operating pressure, high pressure side	bar	43	43	43
Permiss. operating pressure, low pressure side	bar	28	28	28
Permiss. operating pressure				
Primary circuit	bar	3	3	3
Secondary circuit	bar	3	3	3

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Specification (cont.)

BW/BWS, WW/WWS		121	129	145
Dimensions				
Total length	mm	1085	1085	1085
Total width	mm	780	780	780
Total height	mm	1074	1074	1074
Connections				
Primary flow and return	G	2	2	2
Heating flow and return	G	2	2	2
Weight				
Heat pump stage 1 (type BW/WW)	kg	282	305	345
Heat pump stage 2 (type BWS/WWS)	kg	277	300	340
Sound power level at 0/35 °C (test with reference to DIN EN ISO 9614-2)	dB(A)	42	45	48

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Heat pump commissioning order

Please send the following order, together with the enclosed system scheme, by fax to your local Viessmann sales office.
We would ask that a competent employee of yours be present during commissioning.

System details:

Client _____

_____

System location _____

_____

_____

Please tick these check points:

- ☐ Hydraulic scheme for system example included:
  - ☐ System example 1
  - ☐ System example 2
  - ☐ System example 3
  - ☐ Sketch for alternative hydraulic scheme
- ☐ Heating circuits fully installed and filled
- ☐ Electrical installation completed
- ☐ Hydraulic lines fully thermally insulated
- ☐ All windows and external doors are sealed
- ☐ Geothermal probes/well and connection lines fully installed
- ☐ Components for cooling mode fully installed (option)

Preferred appointment:

1. Date _____
   Time _____
2. Date _____
   Time _____

All work ordered from Viessmann will be charged to me/us in accordance with the current Viessmann pricelist.

Place/date _____

Signature

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Declaration of conformity

We, Viessmann Werke GmbH & Co KG, D-35107 Allendorf, declare as sole responsible body that the product **Vitocal 300-G, type BW/BWS, WW incl. Vitotronic 200, type WO1A** complies with the following standards:

DIN 7003
DIN 8901
DIN 8975
DIN EN 50 090-2-2; 2007-11
DIN EN 55 014-1; 2007-06
DIN EN 55 014-2; 2009-06
DIN EN 55 022; 2008-05
DIN EN 60 335-2-40; 2006–11
DIN EN 60 335-1 with A1; 2007–02
DIN EN 61 000-3-2; 2006-10
DIN EN 61 000-3-3; 2009-06
DIN EN 61 000-3-11; 2001-04
DIN EN 61 000-3-11; 2005-09
DIN EN 62233 2008-11 (VDE 0700-366)
DIN EN 62233 Rep.1 2009-04 (VDE 0700-365)
EN 292/T1/T2
EN 294
EN 349
EN 378; 2008-05
BGR 500, Chapter 2.35

In accordance with the following Directives, this product is designated with CE:

2004/108/EC
97/23/EC
98/37/EC
2006/95/EC

Details according to the Pressure Equipment Directive (92/93/EC): Category II, module A1

The **product characteristics** determined as system values for the product **Vitocal 300-G** (see technical guide) can be utilised to assess the energy consumption of heating and ventilation systems to DIN V 4701-10 specified by the EnEV [Germany].

Allendorf, 10 November 2009

Viessmann Werke GmbH & Co KG

pp. Manfred Sommer

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Keyword index

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Applicability

Brine/water and water/water heat pump Vitocal 300-G, single and two-stage

Serial no. **Output**	**Type BW/WW**	**Type BWS/WWS** **(heat pump stage 2)**
21 kW	7424 066 9 00000 ...	7424 072 9 00000 ...
29 kW	7424 067 9 00000 ...	7424 073 9 00000 ...
45 kW	7424 068 9 00000 ...	7424 074 9 00000 ...

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